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COMMERCIAL FISHERIES REVIEW

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FISH and WILDLIFE SERVICE
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DOUGLAS McKAY, SECRETARY

FISH AND WILDLIFE SERVICE

JOHN L. FARLEY, DIRECTOR

COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries
prepared in the BRANCH OF COMMERCIAL FISHERIES

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Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Director, Fish and Wildlife Service, U. S. Department of the Interior, Washington 25, D. C.

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COMMERCIAL FISHERIES REVIEW

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REGIME OF THE HIGH SEAS AND THE CONSERVATION OF THE WORLD'S FISHERIES RESOURCES

Part I - Some Recent Developments Affecting the Regime of the High Seas [1]

At no time during more than a century have those areas of international law relating to the rights of states in the waters outside their land limits been the subject of such concern as they are at the present time. I have thought it would be of interest to consider this evening what those rights are, the developments that challenge them, and the position of the United States respecting them.

History has a way of repeating itself, and since the development of this phase of the law has a bearing on our current problems, I ask this learned group to bear with me while I recall some historic facts.

DEVELOPMENT OF THE LAW OF THE SEA

The history of the law of the sea is a reflection of the changing interests of the centuries, and of the influence of economics and technological developments. Most important maritime states, at one time or another, have claimed sovereignty over large areas of the seas.

The Roman Empire claimed the Mediterranean as Mare Nostrum. In later centuries Venice levied tribute on vessels navigating the Adriatic. Genoa claimed sovereignty of the Ligurian Sea.

England's claim to sovereignty of the "English Sea" has been characterized as "in a class by itself." This, Selden in 1635 described as "that (sea) which flows between England and the opposite shores and ports," which would include at least the North Atlantic, the North Sea, and the English Channel.

No more modest were the conflicting claims of Spain and Portugal, resolved by Pope Alexander, in 1493, by partitioning the Atlantic Ocean between them.

Such was the situation when Grotius, in 1609, published "Mare Liberum," attacking on broad grounds of equity the whole principle of national dominion over the seas. Although Selden's "Mare Clausum," in 1635, sought to establish that the sea was capable of appropriation and that England was sovereign in the English sea, it did not prove to be an adequate answer to Grotius. As one author observes, "The reason why 'Mare Liberum' acquired a historical significance. . . was its earnest and powerful appeal for complete freedom of the high seas for the innocent use and mutual benefit of all." The same author continues: "Grotius spoke in the name of humanity as against the selfish interests of a few. It was his lofty moral ideas which, in combination with the profound legal and historical exposition, gave his work its reputation."[2] With "Mare Liberum" the modern doctrine of the freedom of the seas had been born. During the early Eighteenth Century it was to become established law, and by the Nineteenth Century it was axiomatic.

1/ Address by Herman Phleger, Legal Adviser of the Department of State, before the American Branch of the International Law Association, New York, N. Y., May 13, 1955. The Department of State Bulletin, vol. XXXII, no. 832 (June 6, 1955), pp. 934-940.

2/ Meyer, The Extent of Jurisdiction in Coastal Waters (1937), p. 23.

Freedom of the seas as a principle of international law means that the open sea is not, and cannot be, under the sovereignty of any state. It signifies that in time of peace vessels may not be interfered with on the high seas. To this principle there are certain limited exceptions. Thus, it has long been recognized that a state may suppress piracy. It may seize a vessel flying its flag without authority. The right of hot pursuit is accepted. The enforcement, on the part of coastal States, of revenue and sanitary laws is recognized.3/ Finally, in this modern age, the right of a state, for defense or security purposes, to take preventive measures on the high seas is in process of development.

UNITED STATES SUPPORTS THE FREEDOM OF THE SEA

It is the traditional policy of the United States to support the principle of freedom of the seas. Early in its history its refusal to compromise that principle was was one of the causes leading to the War of 1812. The effective defense of the United States, the maintenance of its commercial shipping and air transport, and the prosperity of its fishing industry would all be prejudiced by any serious compromise of this principle.

The appropriation by any state of areas of the high seas is as unsound morally today as when Grotius wrote. In an age when technological advancement and increased population have made us indeed one world, it is more important than ever that those natural avenues of intercourse between peoples--the sea lanes and the air routes above--should remain free.

ATTACKS ON THE FREEDOM OF THE SEAS

Nevertheless, the freedom of the seas is under serious attack. It might be expected that, as in the past, attempts to bring large areas of the high seas under national dominion would originate with powerful and maritime states. But the contrary is the case. Today the attempts to encroach upon the freedom of the seas are being made for the most part by small coastal states.

These attempts take various forms. Some states enlarge the area of their inland waters by drawing lines from headland to headland; and then, from this baseline, which may be many miles at sea, measuring the width of their territorial waters. Others simply extend the width of their territorial waters by decree. More recently, a favored technique has been to claim exclusive sovereignty over the waters above the continental shelf and beyond territorial waters. Some claims to territorial waters extend to a breadth of 200 miles.

On August 18, 1952, Peru, Chile and Ecuador signed a Declaration, claiming "exclusive jurisdiction and sovereignty" over waters contiguous to their coasts "up to a minimum distance of 200 nautical miles," as well as "exclusive sovereignty" over the subsoil and sea bed in this maritime zone. The Declaration purports, further, to make provision for regulating fishing and whaling in this zone. The United States protested these claims on the ground that under international law there is no obligation to recognize claims to territorial waters in excess of three miles.

Other South American states, including Argentina, Honduras, and El Salvador have also claimed large areas of the high seas as territorial waters.

In 1952, Korea, by presidential proclamation, asserted sovereignty over the seas adjacent to its coasts. There are indications that the Philippines may claim the Sulu Sea as territorial waters.

3/ Oppenheim, International Law (7th ed. by Lauterpacht, 1948), p. 450.

UNITED STATES ADHERES TO THE THREE-MILE LIMIT

Consistent with its support of the principle of the freedom of the seas, the United States has always adhered to the three-mile rule. From the time of Jefferson, the principle that the marginal belt extends one marine league (three geographical or nautical miles) from the low-water mark, has been supported by the State Department, by court decisions, and treaties.

Recently in the Submerged Lands Act (approved May 22, 1953[4/]), the Congress declared that the boundaries of the coastal states are limited to three geographical miles into the Atlantic and Pacific Oceans. By the same Act, the Congress left the states bordering the Gulf of Mexico free to establish historic claims to boundaries extending more than three geographical miles, but limited such boundaries, if established, to three marine leagues from the coast.

The tendency of states to advance claims to territorial waters in excess of three miles has been particularly marked following the failure of the Codification Conference in 1930 at The Hague to agree on a convention on territorial waters. However, states still adhering to the three-mile rule represent about 80 percent of the merchant-shipping tonnage of the world and most of its naval power.

POSITION OF THE UNITED STATES ON INTERNATIONAL LAW QUESTION

The position of the United States is shown in its comments on the Draft Articles on the Regime of the Territorial Sea of the International Law Commission,[5/] which include the following:

> "So far as concerns the question of the breadth of the territorial sea . . . the guiding principle of the Government of the United States is that any proposal must be clearly consistent with the principle of freedom of the seas. . . .
>
> "That the breadth of the territorial sea should remain fixed at three miles, is without any question the proposal most consistent with the principle of freedom of the seas. The three-mile limit is the greatest breadth of territorial waters on which there has ever been anything like common agreement. Every one is now in agreement that the coastal state is entitled to a territorial sea to that distance from its shores. There is no agreement on anything more . . . A codification of the international law applicable to the territorial sea must, in the opinion of the Government of the United States, incorporate this unique status of the three-mile limit and record its unquestioned acceptance as a lawful limit.
>
> "This being established, there remains the problem of ascertaining the status of claims to sovereignty beyond the three-mile limit. The diversity of the claims involved bears witness . . . to the inability of each to command the degree of acceptance which would qualify it for possible consideration as a principle of international law. . . . A codification of the international law applicable to the territorial sea should, in the view of the Government of the United States, record the lack of legal status of these claims."[6/]

The International Court of Justice made clear in the Norwegian Fisheries case that the delimitation of territorial waters is not a matter dependent merely upon the

4/ 67 Stat. 29.

5/ Report of the International Law Commission Covering the Work of its Sixth Session, 3 June-28 July 1954, U. N. doc. A/2693, p. 12.

6/ Regime of the Territorial Sea, Comments by Governments on the Provisional Articles concerning the Regime of the Territorial Sea adopted by the Territorial Law Commission at its Sixth Session, U. N. doc. A/CN.4/90, 29 March 1955, pp. 33, 34-35.

will of the coastal state but that "the validity of the delimitation with regard to other states depends upon international law."[7]

CONSERVATION OF FISHERY RESOURCES

But while the United States does not consider that claims to territorial waters in excess of three miles have validity, with the possible exception of historic ones generally acquiesced in, it does not consider that the considerations which motivate such claims can or should be ignored. What are these considerations? While oversimplification is dangerous, it is suggested that they relate to fishery resources. As one authority has put it, "the fishery question has been the focal point of the whole problem of territorial waters from its very beginning."[8]

With those states which are concerned over the depletion of high seas fisheries and desire to take measures for their conservation, the United States has every sympathy. The dictum of Grotius that the resources of the sea are inexhaustible has long since been recognized as unsound. As long ago as the Bering Sea arbitration the United States asserted that unrestricted destruction of the living resources of the sea--in that case, fur seals--was contrary to good morals. The United States is a party to more treaties and agreements having for their objective the conservation of the resources of the sea than any other country.

On September 28, 1945, President Truman issued his proclamation on fisheries for the purpose of "improving the jurisdictional basis for conservation measures and international cooperation in this field.[9] This declares the policy of the United States on the establishment of fishery conservation zones in the high seas contiguous to its coasts. Where such fishing activities are maintained by United States nationals alone, it regards it as proper that regulation be exercised by the United States exclusively. But where the fishing activities have been legitimately developed and maintained jointly by nationals of the United States and nationals of other states, conservation zones may be established by agreement between the United States and such other states.

This proclamation has been misunderstood by some as implying a claim to exclusive fishing rights for United States nationals in the waters off its coasts. The proclamation asserts no such claim, and such is not the position of the United States.

As the Secretariat of the United Nations has pointed out in its Memorandum on the Regime of the High Seas: "There is a fundamental difference between the United States Proclamation on Fisheries and the Latin American texts which have followed it.[10] President Truman's proclamation specifically stated that "The character as high seas of the areas in which such conservation zones are established and the right to their free and uninhibited navigation are in no way thus affected." The sole purpose of the proclamation was to make possible by appropriate legal means the prevention of the depopulation and destruction of international fishing grounds.

Notwithstanding this, the United States proclamations on fisheries and on the continental shelf[11] have been used by some states as a justification for attempts to extend their sovereignty over large areas of the high seas. The International Law Commission of the United Nations no doubt had these measures in mind when it pointed out in connection with its draft articles on fisheries adopted at its Fifth Session (1953) that regulations issued by a state for the conservation of fisheries in any area of the high seas outside its territorial waters are binding only upon its na-

7/ ICJ Reports, Judgement of Dec. 18, 1951, pp. 116, 132.
8/ Riesenfeld, Protection of Coastal Fisheries under International Law (1942), p. 3.
9/ The Department of State Bulletin, Vol. XIII, no. 327 (Sept. 30, 1945), p. 486.
10/ Memorandum (mimeographed) prepared for the Second Session of the International Law Commission, U. N. doc. A/CN.4/32, July 14, 1950, p. 47.
11/ The Department of State Bulletin, Vol. XIII, no. 327 (Sept. 30, 1945), p. 485.

tionals and that such unilateral measures resulting in the total exclusion of foreign nationals are "in disregard of the law as it stands at present."[12]

INTERFERENCE WITH FISHING ON THE HIGH SEAS

So far as the United States is concerned, the immediate impact of these claims of South American states has fallen upon its fishing industry whose vessels fish in the Pacific as far south as Peru. There has resulted a series of incidents ranging from molestation of American fishing vessels by local authorities at points far off the coast, to the seizure of the craft and their detention until heavy fines are paid.

To insure that these losses should not fall upon private persons, the Congress on August 27, 1954, enacted a statute providing that where a United States flag vessel is seized by a foreign country on the basis of claims in territorial waters or the high seas not recognized by the United States and a fine must be paid in order to secure a release of the vessel and crew, the owners shall be reimbursed by the Treasury upon certification by the Secretary of State.[13] Several claims for such reimbursement are pending at the present time.

Perhaps the most conspicuous example of the efforts to enforce claims of sovereignty to the high seas was the seizure last November by Peruvian war vessels and and aircraft of five whaling vessels owned by A. S. Onassis flying the Panamanian flag. According to information furnished by Panama to the Organization of American States, two of the vessels were captured approximately 160 miles off the Peruvian coast; two others were attacked with bombs and machinegun fire by Peruvian naval and air units while 300 miles off the coast; and later the factory vessel was attacked by a Peruvian plane 364 miles offshore. These vessels were taken into a Peruvian port and detained until fines of 3 million dollars were paid. Insurance against this hazard was held by Lloyd's (90 percent) and by insurers in the United States (10 percent). Panama, the United Kingdom, and the United States protested to Peru concerning the incident.

On March 27, 1955, Ecuador seized two American flag fishing vessels, the Arctic Maid and Santa Ana, some 14 to 25 miles west of the Island of Santa Clara off the Ecuadoran coast. In the course of the seizure, an American seaman was seriously wounded by gunfire from an Ecuadoran patrol vessel. Although the United States made a strong protest against these illegal acts, fines of more than $49,000 were imposed on the two vessels.

UNITED NATIONS ACTIVITIES IN THIS FIELD

The draft articles on Fisheries prepared by the International Law Commission of the United Nations have not yet been considered by the General Assembly. However, the Assembly at its Ninth Session (1954) convoked an international conference to consider the economic and technical aspects of the living resources of the high seas to meet in Rome on April 18 of this year.[14] It is hoped that this Conference will recommend measures for the regulation and conservation of high-seas fisheries that will satisfy the legitimate interests of coastal states while at the same time preserving the freedom of the seas.

TRUMAN PROCLAMATION ON THE CONTINENTAL SHELF

On September 28, 1945, the same date as his proclamation on fisheries, President Truman issued another proclamation, which is also important in any consideration of this subject. This is the proclamation on the continental shelf.[15]

12/ Report of the International Law Commission Covering the Work of its Fifth Session, 1 June-14 August 1953, U. N. doc. A/2456, p. 17.
13/ 68 Stat. 883.
14/ The Department of State Bulletin, Vol. XXXII, Jan. 10, 1955, p. 64, and Apr. 25, 1955, p. 696.
15/ The Department of State Bulletin, Sept. 30, 1945, p. 485.

It sets forth the view of the United States that the exercise of jurisdiction over the natural resources of the subsoil and seabed of the continental shelf by the contiguous nation is reasonable and just for the following reasons:

1. The effectiveness of measures to use or conserve these resources would be contingent upon cooperation and protection from the shore;

2. The continental shelf may be regarded as an extension of the land mass of the coastal nation and thus naturally appurtenant to it;

3. The resources under the shelf frequently form a seaward extension of a pool or deposit lying within the territorial limits; and

4. Self-protection compels a coastal nation to keep close watch over the activities off of its shores which are necessary for utilization of these resources, i.e., drilling and mining operations.

In the interest of law and order, jurisdiction over the activities in these offshore areas should be determined. It is submitted that it is reasonable that this jurisdiction should inhere in the coastal state since these activities must receive cooperation and protection from the shore and they affect the safety of the coastal state.

The proclamation declares that the United States regards the natural resources of the subsoil and seabed of the continental shelf as appertaining to the United States and subject to its jurisdiction and control. Where the shelf extends to the shore of another state, the boundary is to be determined by the interested parties on equitable principles. Finally, the proclamation declares that "The character as high seas of the waters above the continental shelf and the right to their free and unimpeded navigation are in no way thus affected."

The draft articles on the Continental Shelf prepared by the International Law Commission describe the rights of the coastal state over the shelf "as sovereign rights for the purpose of exploring and exploiting its natural resources," thus recognizing that the rights are over the shelf and not merely over its resources. The term "sovereign rights" was preferred by the drafters over the expressions "jurisdiction and control" advocated by some nations and "rights of sovereignty" preferred by others. In explanation, the International Law Commission stated that the formulation "sovereign rights" rather than "sovereignty" was employed in an effort "to avoid language lending itself to interpretations alien to an object which the Commission considers to be of decisive importance, namely, safeguarding the principle of the full freedom of the superjacent sea and the airspace above it."16/

This principle is made clear in the Truman proclamation and is reaffirmed in the Outer Continental Shelf Lands Act (Sec. 3(b)), which provides:

> ". . . the character as high seas of the waters above the outer continental shelf and the right of navigation and fishing therein shall not be affected."17/

The principle is also declared in Articles 3 and 4 of the International Law Commission's 1953 draft which state that the rights of the coastal state over the continental shelf do not affect the legal status of the superjacent waters as high seas or the legal status of the air space above the superjacent waters.18/

16/ Report of the International Law Commission Covering the Work of its Fifth Session, 1 June-14 August 1953, U.N. doc. A/2456, pp. 12, 14.

17/ 67 Stat. 462.

18/ Report of the International Law Commission Covering the Work of its Fifth Session, 1 June-14 August 1953, U. N. doc. A/2456, p. 12.

The term "continental shelf" is not defined in the Truman proclamation. However, the accompanying White House press release[19/] stated that generally the subsoil and seabed of the submarine areas contiguous to the coasts of the United States was considered to be limited to submerged land covered by no more than 100 fathoms (600 feet) of water. This limitation--defined in Article 1 of the International Law Commission's draft as 200 meters--would seem to cover all practicable needs for the foreseeable future and to have the advantage of definiteness. If future technical advances should render this formulation inadequate, it can be reconsidered in the light of intervening experience.

That the principles of the Truman proclamation on the continental shelf were considered fair and reasonable is evidenced by the fact that no nation protested the claim and that it has been followed by similar claims by numerous other States. Certain United Kingdom practice and the pronouncements with respect to the Persian Gulf are comparable, in considerable measure, to the Truman proclamation. The Latin-American practice differs however, as I will now point out.

ERRONEOUS APPLICATION OF THE CONTINENTAL-SHELF DOCTRINE

Following the United States proclamation, Mexico announced its claim to the adjacent continental shelf and its natural resources, and also announced that it would "proceed to supervise, utilize, and control the zones of fishing protection which are necessary for the conservation of this source of well-being."

The Argentine Presidential Decree of October 1946, broadening an earlier decree of 1944, proclaimed Argentine's sovereignty over both the continental shelf and its sea. While it recognizes the right of free navigation in the sea above the shelf, this would appear to mean no more than a right of innocent passage. The Argentine Decree asserts that the United States has proclaimed its sovereignty both over the shelf and the peripheral epicontinental sea. This assertion is not, of course, accurate for the United States stated specifically that the proclamation did not affect the status as high seas of the waters above the shelf.

In June 1947, Chile proclaimed its sovereignty over the continental shelf at whatever depth, and over all of the waters adjacent to its coasts to the full extent necessary to reserve, protect, conserve and make use of the natural resources within or below those seas. It referred specifically to the control of fisheries, and as a first step, announced a protection zone "at present" extending 200 nautical miles from the coast.

Chile sought to justify these claims by asserting that the United States, Mexico, and Argentina had already proclaimed their sovereignty over the shelf and seas adjacent to their coasts. Clearly, this assertion misapprehends the United States position and apparently employs the continental-shelf principle only as an argumentative concept, for Chile has a very narrow continental shelf.

Peru, also with a narrow continental shelf, followed the Chilean form of proclamation. Costa Rica, in 1948, by decree-law followed the Chilean pattern.

Ecuador as a party to the Santiago Conference declaration of 1952, claims sovereignty to a distance of 200 miles seaward and over the sea bed regardless of depth.

In 1950 Honduras claimed the continental shelf and the waters above as national territory, and in 1951 claimed protection and control over the Atlantic Ocean within 200 miles from the low-water line.

Certain states in support of their claims have referred to two multilateral pronouncements of the American Republics--the Declaration of Panama and the Inter-American Treaty of Reciprocal Assistance.

19/ The Department of State Bulletin, Vol. XIII, no. 327 (Sept. 30, 1945), p. 484.

The first, delimited certain areas of the high seas adjacent to the American Continent, in which the participants declared their interest as a matter of self-defense. The latter merely described an area, in which aggressive action activated certain provisions of the Treaty. But neither of these furnish a foundation for the unilateral assertion by a coastal state of sovereignty over the high seas.

It seems evident that the states making these excessive claims realize the insecurity of their legal justification. Apart from reference to these two inter-American pronouncements of an entirely different character, this is indicated by the imprecise nature of their definition: the attempts to justify them on the basis of similar action by other states with similar objectives, and the obvious misapprehension of the United States proclamations where cited as a justification.

NO INCONSISTENCY WITH THE FREEDOM OF THE SEAS

It is submitted that the doctrine of the continental shelf is in no way inconsistent with the principle of the freedom of the seas. The 1945 proclamations on the continential shelf and the Outer Continental Shelf Lands Act make perfectly clear that the claims of the United States in the shelf are not intended to modify in any way the freedom of the superjacent waters.

While, as stated in the 1950 Report of your learned Society, the continental shelf theory fills the gap in international law on this subject,20/ the application of the new theory will create many legal problems the definitive answers to which will only become apparent with time and experience.

CONCLUSION

The principle of the freedom of the seas is as valid today as when it was established. It is even more necessary now that these highways of communication be kept open. We cannot return to the middle ages or the days of the Barbary pirates when coastal states exacted tribute for rights of navigation. Nor can we return to those days when strong and enterprising states appropriated the resources of the seas by appropriating the seas themselves.

If the resources of the sea have become more important because of the needs of increased populations for food and their decrease due to wasteful exploitation, the answer is not to be found in disregarding existing international law by unilateral extension of territorial waters or new definitions of such waters. Nor is the answer to be found in the exaction of tribute for the right to fish on the high seas. Such actions have already gone far toward upsetting otherwise good relations between states.

The alternative is a program of conservation of fisheries; the application by international agreement of control based on scientific principles. While due recognition must be given to the special interest of the coastal state in the resources off its coasts, the rights of the other members of the international community must also be respected.

The same principle should govern the application of the doctrine of the continental shelf. The right of the coastal state to the resources of its continental shelf cannot be made an excuse for reduction of the high seas above the shelf to the sovereignty of the coastal state and any exploitation of its resources must be so conducted as to result in a minimum interference with the common use of the superjacent seas.

20/ Report of the Forty-fourth Conference, Copenhagen, 1950, International Law Association (1952), p. 132.

Part II - United States Position on Conservation of World's Fisheries Resources[21/]

The United States participated in the International Technical Conference on the Conservation of the Living Resources of the Sea at Rome, April 18-May 10, 1955, pursuant to a resolution of the General Assembly of the United Nations adopted at its ninth session, December 14, 1954. The Commission studied the problem of the international conservation of the living resources of the sea and made appropriate scientific and technical recommendations.

The subject of fisheries is one of the principal aspects of the problems of the regimen of the high seas which are currently under consideration in various organs and agencies of the United Nations and the Organization of American States. Conflicts of interest over fisheries have in some instances given rise to controversies between states over the right of vessels to fish in certain waters. In other instances, the existence of conflicting interests has stimulated the negotiation of constructive international agreements for the orderly regulation of fisheries in the interests of all states directly concerned.

The principal cause for the development of conflicts of interest between states over the subject of fisheries during recent years has been the increased interest of coastal states in the conservation of fishery resources in waters off their coast. The actual or potential economic importance of fishery resources has received wider recognition during the last decade than formerly. Public interest in coastal states has been aroused over the possibility that these important resources may be exhausted or severely depleted by unrestricted exploitation. Development of more efficient methods of exploitation by countries long used to fishing on the high seas has contributed to the desire of coastal states to protect and conserve the productivity of the resources of the adjacent sea. At the same time, the inadequacy of contemporary scientific knowledge regarding many aspects of the problem of conservation has aroused a renewed interest in promoting further scientific investigations.

Efforts by coastal states to impose regulations upon fishing in the high seas adjacent to territorial waters have conflicted with the rights of other nations to fish upon the high seas. Under the long-established and universally recognized principle of the freedom of the seas, the vessels and nationals of all states have rights not only of navigation but also of fishing in the high seas, i.e., in waters outside of the belt of coastal waters which under international law has traditionally been recognized as territorial waters. The right of the nationals of any state to fish upon the high seas is thus based upon a fundamental principle of international law. The Government of the United States recognized this fact in the proclamation on fisheries issued by the President in 1945, which, when stating certain interests of the United States in conserving fishery resources, specifically recognized the rights of other nations to fish in the high seas off its coasts.

The problem now facing governments throughout the world is how to reconcile the legitimate interests of the coastal state in desiring to maintain the productivity of fishery resources off its coast with the established right of all states to fish freely upon the high seas. Some states have attempted, by unilateral action, to impose control on fishing activities in the high seas off their coasts by claiming sovereignty or other forms of jurisdiction over such waters. Other states have recognized the interest of all concerned by negotiating agreements having as their objective the management of the exploitation of the fisheries resources in such a way as to maintain their maximum productivity for the beneficial use of all the interested parties.

The United States Government is firmly convinced that the latter approach is more likely to achieve practical and beneficial results from the scientific and economic viewpoint and, at the same time, avoid serious breaches of international law

21/ Reprinted from The Department of State Bulletin, Vol. XXXII, no. 826 (April 25, 1955), pp. 696-700; a summary prepared in the office of the Special Assistant to the Under Secretary of Fisheries and Wildlife.

which would adversely affect other interests associated with the principle of the freedom of the seas as well as rights to fish.

A consideration of important technical factors affecting the problem of fishery regulation readily reveals serious deficiencies in any approach to this problem which would give the coastal state alone the right to regulate the exploitation of fishery resources in high seas adjacent to its territorial waters. If such a principle were adopted, the responsibility for maintaining the productivity of the fishery resources would devolve upon each coastal state. Yet there are many coastal states which lack the technical resources for the study of problems associated with the maintenance of fisheries and would therefore lack the basic information on which to formulate conservation programs. Moreover, the study of fishery problems often involves elaborate and extensive operations of laboratories, laboratory ships, and other facilities which would be beyond the financial possibilities of many coastal states to develop or maintain. Further costs would be involved in the unilateral policing of high seas areas for the purpose of enforcing any regulations which might be adopted. Finally, it must be recognized that the very nature of fishery problems defies treatment along strictly national lines: many stocks of fish, particularly those having major economic importance, normally move and exist in large areas of the sea and can, therefore, neither be studied nor controlled within the waters adjacent to individual coastal states.

Economic factors likewise emphasize the inadequacy of a principle under which individual coastal states would unilaterally assume responsibility for the control of fisheries in the high seas off their coast. The purpose of fishery development is to produce fish, primarily for food, whether for consumption by the coastal state itself or for sale in other markets. Experience has demonstrated that the possibility of successful exploitation of fishery resources depends upon the production of food at a price which will create and sustain a market. There are already many evidences of efforts to develop fishery resources which have failed because of an inability to produce fish at a sufficiently low price.

Low costs in the production of fish require sustained operations of boats and other facilities, including packing plants, throughout all or most of the year. This in turn requires in many cases the development of fishing fleets capable of ranging beyond the limits of coastal states--particularly the smaller coastal states--in pursuit of stocks of fish. If the high seas were to become divided into unilaterally controlled areas, each coastal state preventing others from entering the waters under its control, the possibilities of developing economically efficient industries capable of converting the living resources of the seas into products of use to man would be severely impeded.

Practical considerations such as those mentioned above are in the opinion of the United States of great importance in determining the suitability of any method of resolving the conflicts of interest to which reference was made earlier in this summary. However, juridical aspects must also be taken into account in devising a satisfactory solution. Under the principle of the freedom of the seas a vessel fishing outside the territorial waters of another state has a well-established right in international law to conduct its operation there. This right cannot be impinged upon or limited by the declarations of one coastal state or a group of such states. On the other hand, the United States Government is entirely ready to recognize that the legitimate interest of coastal states must be given weight in establishing a system of law with reference to fisheries conservation which will resolve the inherent conflict of interests discussed herein.

Freedom of the seas includes not only the right to navigate on the high seas but also the right to fish freely in those waters and enjoy certain other rights. Action taken by the coastal state to limit freedom of the seas with respect to fisheries cannot fail to have wide repercussions upon the interests and rights of other states.

There is not, in the view of the United States, any fundamental and legitimate interest of coastal states, or of other states, which cannot be satisfactorily reconciled through a procedure of international agreement based upon a negotiation among states enjoying equal sovereignty and equal rights. Already the United States Government has enjoyed the beneficial results of agreements with certain other states respecting fisheries under which the resources of certain areas of the seas of interest to the states concerned have been developed, increased, and maintained to the economic advantage of all. Under such conservation agreements, the resources of more than one state have been brought to bear upon the study and solution of technical problems. Facilities of the directly interested states have been used in the development and enforcement of regulations for the exploitation of such resources. Methods for the settlement of points on which agreement is not reached through direct negotiation have been established in advance, in keeping with the principle of the peaceful solution of international differences.

The opinion has been expressed by some states that solution of international conservation problems by agreements among all interested states is severely handicapped or in some cases impossible owing to the fact that such agreements are voluntary and may be invalidated by failure of a single state to cooperate. The United States Government recognizes that this is a problem of some importance. It is under active study by the International Law Commission of the United Nations and will be considered by the United Nations General Assembly at a later date. The United States Government has cooperated and will continue to cooperate with other governments in supporting and encouraging the International Law Commission and the General Assembly in developing and obtaining acceptance of a satisfactory set of international principles for fishery conservation to meet this problem.

The United States Government is convinced, on the basis both of law and of practical experience, that the most satisfactory avenue for the solution of growing conflicts of interest over fishery resources lies in the development of conservation agreements among interested states. It is likewise convinced that continued efforts by coastal states to extend unilaterally their jurisdictional control over areas recognized under international law as being high seas cannot fail to aggravate existing international disputes and create new ones. It is the earnest desire of the United States to avoid such disputes and to assist in achieving the legitimate aim of all interested parties, namely, the maintenance of the productivity of the fishery resources for maximum beneficial human use.

Part III - United States Views on Draft Articles on Regime of Territorial Sea [22/]

The Secretary-General of the United Nations on March 29 circulated the texts of comments received from member governments on provisional articles concerning the regime of the territorial sea which the International Law Commission had adopted at its sixth session in 1954. Following is the text of the reply of the United States:

NOTE VERBALE FROM THE PERMANENT DELEGATION OF THE UNITED STATES TO THE UNITED NATIONS DATED 3 FEBRUARY 1955

The Representative of the United States of America to the United Nations presents his compliments to the Secretary General of the United Nations and has the honor to refer to the note LEG 292/9/01, dated August 31, 1954, from the Principal Director in charge of the Legal Department, concerning the Draft Articles on the Regime of the Territorial Sea of the International Law Commission set out in the Report covering the work of its sixth session, June 3-July 28, 1954.

The Commission prepared a provisional text for all but four of the articles of the proposed draft and requested the comments of Governments on these articles. Among the articles for which no text has yet been drafted is Article 3 concerning the breadth of the territorial sea. With respect to this article, the Commission requested views and suggestions which might help it to formulate a concrete proposal.

22/ Reprinted from The Department of State Bulletin, Vol. XXXII, no. 826 (April 25, 1955), pp. 696-700; a summary prepared in the office of the Special Assistant to the Under Secretary of Fisheries and Wildlife.

So far as concerns the articles now drafted, the Government of the United States believes that they constitute, as a whole, a sound exposition of the principles applicable to the regime of the territorial sea in international law. The Government of the United States has, however, certain suggestions to make with respect to Articles 5 and 19.

Article 5 provides inter alia that where circumstances necessitate a special regime because the coast is deeply indented or cut into "or because there are islands in its immediate vicinity" the base line may be independent from the low-water mark and may be a series of straight lines. The Government of the United States presumes from the comments which follow the article that it was not intended that the presence of a few isolated islands in front of the coast would justify per se the use of the straight line method. The islands, as the comments indicate, would have to be related to the coast in somewhat the same manner as the skjaergaard in Norway. In the view of the Government of the United States, the words "or because there are islands in its immediate vicinity" are too general and do not convey as accurately as desirable what the Commission apparently had in mind.

With respect to Article 19, the Government of the United States is satisfied that the text incorporates principles upheld by the International Court of Justice in its judgment of April 9, 1949, in the Corfu Channel case, but it believes that the comments on this article should include a short statement of the factual circumstances upon which the court was ruling, since such a statement would point up and illustrate the significance and meaning of the principles embodied in Article 19.

So far as concerns the question of the breadth of the territorial sea and the various suggestions set out in paragraph 68 of the Report, the guiding principle of the Government of the United States is that any proposal must be clearly consistent with the principle of freedom of the seas. Some of the proposals amount to a virtual abandonment or denial of that principle. In this connection it must be pointed out that the high seas are an area under a definite and established legal status which requires freedom of navigation and use for all. They are not an area in which a legal vacuum exists free to be filled by individual states, strong or weak. History attests to the failure of that idea and to the evolution of the doctrine of the freedom of the seas as a principle fair to all. The regime of territorial waters itself is an encroachment on that doctrine and any breadth of territorial waters is in derogation of it; so the derogations must be kept to an absolute minimum, agreed to by all as in the interest of all.

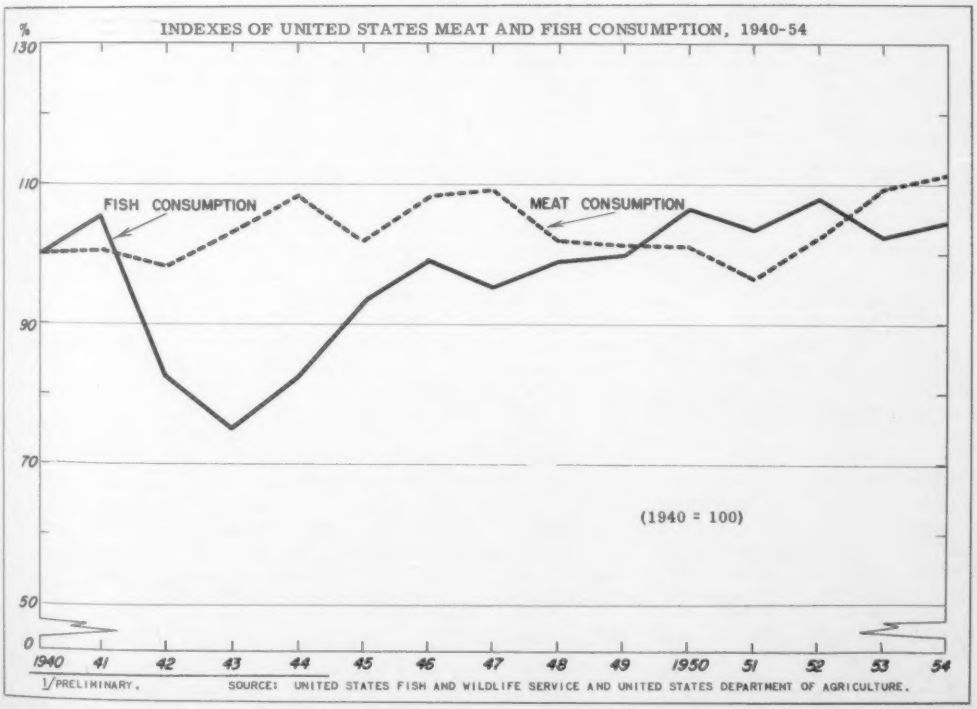
That the breadth of the territorial sea should remain fixed at three miles, is without any question the proposal most consistent with the principle of freedom of the seas. The three-mile limit is the greatest breadth of territorial waters on which there has ever been anything like common agreement. Every one is now in agreement that the coastal state is entitled to a territorial sea to that distance from its shores. There is no agreement on anything more. If there is any limit which can safely be laid down as fully conforming to international law, it is the three-mile limit. This point, in the view of the Government of the United States, is often overlooked in discussions on this subject, where the tendency is to debate the respective merits of various limits as though they had the same sanction in history and in practice as the three-mile limit. But neither 6 nor 9 nor 12 miles, much less other more extreme claims for territorial seas, has the same historical sanction and a record of acceptance in practice marred by no protest from other states. A codification of the international law applicable to the territorial sea must, in the opinion of the Government of the United States, incorporate this unique status of the three-mile limit and record its unquestioned acceptance as a lawful limit.

This being established, there remains the problem of ascertaining the status of claims to sovereignty beyond the three-mile limit. The diversity of the claims involved bears witness, in the opinion of the Government of the United States, to the inability of each to command the degree of acceptance which would qualify it for possible consideration as a principle

of international law. Not only does each proposed limit fail to command the positive support of any great number of nations, but each has been strongly opposed by other nations. This defect is crucial and, in view of the positive rule of freedom of the sea now in effect in the waters where the claims are made no such claim can be recognized in the absence of common agreement. A codification of the international law applicable to the territorial sea should, in the view of the Government of the United States, record the lack of legal status of these claims.

While unilateral claims to sovereignty or other forms of exclusive control over waters heretofore recognized as high seas cannot be regarded as valid, this is not to say that the reasons, legitimate or otherwise, which motivate such claims should be ignored. In some cases, at least, these attempts of the coastal state to appropriate to its exclusive use large areas of the high seas seem to be based on a real concern for the conservation of the resources of the sea found in such waters. Efforts of the Commission and of the nations to settle such problems should be unceasing. But the remedy is not unilateral action in defiance of long established and sound principles of law applicable to other matters. In many cases the nations taking such action would seem to have little to gain from abandonment of such principles and reversion to a condition of anarchy on the high seas. The sounder approach would appear to be an effort to reach agreement on the principles applicable to the real matters at issue, such as conservation of natural resources and rights to fish.





EARLY EXPERIENCES WITH FISH OILS -- A RETROSPECT

By Charles E. Bills*

Because of the interest in the property of fish oils, this article is being reprinted in this periodical since we feel it contains some interesting observations regarding the properties of various fish oils.

The Editors

I was fortunate in having my last year of graduate work under Professor E. V. McCollum. This was shortly after his group discovered vitamin D in cod-liver oil and just before Steenbock and Hess associated D with ultraviolet light and the sterols. My thesis dealt with the occurrence and properties of the new vitamin and some improvements on McCollum's line test for measuring it. It included the finding that a fish body oil (menhaden) is, like the liver oils, a source of vitamin D.

One of the visitors at Johns Hopkins in early 1924 was E. Mead Johnson, Jr., the baby-food manufacturer, who had it in mind to remove cod-liver oil from the folk medicine category and to promote it on its merits. We met in the rattery, and, after a few days of deliberation, I agreed to organize a research laboratory for his company at which fish oils should receive further study. I sketched some floor plans, and the architect and builder went to work.

Johnson and I spent six weeks of the summer in Newfoundland, touring the fisheries and learning what we could about the habits of cod and the production of oil. There we met Jack Drummond, who had come over from London on a similar mission. Drummond was interested to hear more about McCollum's new vitamin, and gave us in exchange much information about the fishing industry. He had recently traced the vitamin A of fish livers to a possible origin in phytoplankton, and he surmised that the vitamin D had a similar lineage, i.e., plankton — little fish — big fish. In view of this I gave particular attention to the collecting of capelin and squid, principal foods of the cod in Newfoundland waters. We made oils from these and a few other species that were fat enough to yield oil by simple rendering. The samples were to be our first study material at the new laboratory.

Delays in construction enabled me to have some additional months in Baltimore, until the end of 1924. This struck me as an opportunity to isolate a specimen of vitamin D from the ample supplies of cod-liver oil now available. I learned that Lawson Wilkins, a young pediatrician with whom I shared laboratory space, was bent on the same accomplishment, and, as we were both in a hurry, we joined forces. We got as far as attempting to fractionate the unsaponifiables in a newly-improved vacuum still put at our disposal by Colonel E. B. Vedder. At this point the vitamin vanished. Years later, when Brockmann did isolate vitamin D from tuna-liver oil, I could better appreciate his achievement. His starting material was hundreds of times more potent than ours, and his principal technique, chromatographic adsorption, was in our day only a botanist's lecture aid.

Professor McCollum contributed to the Mead Johnson laboratory a breeding stock of rats, descendants of those with which he discovered vitamins A and D. The genealogy of this distinguished line deserves mention. Originally assembled for genetic studies, the strain was a mixture of albinos, Irish blacks, and a wild buff sport from the Liverpool docks. Under McCollum at Wisconsin, they were probably the first rats ever to be used in nutritional research. I in turn supplied a branch of the family to Windaus and Holtz at Gottingen and to laboratories elsewhere.

The Evansville laboratory was ready on January 1, 1925. My first assistant was F. G. McDonald, recently graduated from Purdue. During the previous fall he

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had built up the rat colony to useful size, and we now began 25 years of work together. From the start it was evident that our efforts would be divided between fish oils and irradiation products, not to mention other fields of nutrition with which the company was concerned.

During 1925 and 1926 we examined a number of oils and fats besides the specimens collected in Newfoundland. We were chiefly interested in vitamin D, and at first paid only incidental attention to the better known vitamin A. Some of this work was planned to broaden our knowledge of the occurrence of vitamin D. Some was directed at the problem of origin. Some was primarily quality control on cod-liver oil. The control work required an inordinate number of rats, but it gave us valuable experience and data from which we built a quantitative procedure out of what formerly had been a pass-or-fail test.

Our first published survey included assays on the oils of 17 marine species. It fairly well established the concept that fish oils are the natural source par excellence of vitamin D. It covered three new body oils (herring, salmon, and sardine) besides the original menhaden oil, each of which was comparable to cod-liver oil as a source of vitamin D. We never could make these body oils palatable enough for human use, but the poultry feed people soon developed a great market for them, especially for sardine oil. This was fortunate, for it released more cod-liver oil to human consumption at a time when it was almost the only source of medicinal vitamin D.

The survey included all the marine oils then produced in quantity, but it gave no encouragement to a search for others. Three of the oils were equal to cod-liver oil, but the only one that was superior was Hess' pufferfish, a curiosity commercially unavailable. Consequently we did little with fish oils from 1927 to 1932, switching to more promising fields, especially the development of synthetic vitamin D. During this period, however, we collaborated with Hess in a study of individual cod livers which brought out the surprising fact that the potency of the oil varies inversely with the fatness of the liver. This was the first intimation that those species of fish which regularly have lean livers may nevertheless be excellent vitamin sources.

In 1931 the Health Organization of the League of Nations held a conference in London to establish international standards for the vitamins. My assignment was to prepare the definition of the vitamin D unit. At this time I again met Drummond and learned that halibut-liver oil exhibits an exceptional vitamin A potency, although the yield of oil is small in comparison with cod. It now seemed in order to take another look at the lean-liver species, and so the program was revived, this time with a strictly Edisonian approach designed to include every fish of major commercial importance.

Our laboratory staff had grown considerably, and was now enlarged for this undertaking. J. C. Wallenmeyer was the procurement man who visited the fisheries on both coasts and arranged for agents in Japan (our principal source), the Philippines,, and southern hemisphere. He devised an extraction process in which liver was liquefied by alkalinizing to a critical pH and the oil recovered centrifugally. Thus it became possible to recover vitamins from the leanest livers, and by scrubbing the aqueous phase with cod-liver oil a high degree of efficiency was realized. Wallenmeyer and I built a vitamin A spectrophotometer which saved countless hours of animal work.

The program got under way early in 1932, and by 1934 we had data on more than 100 species. European workers had noted an interesting correlation between zoologic order and vitamin storage in liver, namely, that the cartilaginous fishes (sharks, etc.) store little vitamin D. We confirmed this, and found several new relationships. The flatfishes (halibuts, soles) were rich in vitamin A; good to poor in D. The rockfishes were mostly superior sources of both vitamins. The cod fishes, in comparison

with most other groups, were only mediocre sources of vitamin D. But above all were the percomorphs (tunas, basses, etc.), most of which carried extraordinary concentrations of vitamins D and A, even hundreds of times more than the cod.

It was obvious that by blending the liver oils of certain percomorph fishes we would have a product of considerable appeal to our physician-customers. But what to call such a product, briefly and definitively without resort to a trade name? Sensing the penchant of doctors for classical terminology, I wanted something reminiscent of Oleum Morrhuae. The local Latin teacher came up with "Oleum Percomorphum," a name which probably contributed much to the commercial success of the product.

Only those in the pharmaceutical business can appreciate the problems which beset a new product. To illustrate: A physician wrote to inquire if "O. P.," used as a food adjunct, is kosher, i.e., if all the species involved are fishes with scales. He knew that one of the component species is endowed with scales when young but loses them at maturity--what, then, is the status? The answer, according to the highest rabbinical authority, was that once a fish is kosher, it so remains.

The fishermen of the world soon had a bonanza. Livers formerly regarded as offal were in such demand that in some species they sold for more than the rest of the fish. The highest price that I recall was $8 a pound for frozen ishinagi liver, the tonnage of which was rather limited. Each species had its price, which we revised from time to time on the basis of assays and oil yield. Our problem now was to dissuade the fishermen from palming off worthless livers for the desired ones. Happily, we soon discovered that a good way to recognize a fish is by its liver. The shape, color, markings, relative size of lobes, and pattern of venules are highly specific, and by these criteria one can differentiate species that are confusingly similar in external appearance. A set of preserved liver standards was used to train our inspectors, who could then sort quantities of freshly thawed material at a glance. This method of distinguishing species is still in use by some of the fish and game authorities.

The percomorph liver oils richest in vitamin D are those from the various tuna species. In 1934 we assayed one of these by Massengale's rat-chick method, and were thereby able to demonstrate the existence of more than one form of vitamin D in nature. Later, when Brockmann isolated vitamin D from tuna-liver oil, it proved to be a mixture of D_2 and D_3.

We never could show how the fish gets its vitamin D. The capelin and squid oils from Newfoundland did not account for the vitamin in the cod. Some catfish that we raised in captivity without a source of vitamin D seemed to accumulate as much as though they had received it, which would point to a synthesis. But some cod that we dosed with ergosterol, and cod livers digested with ergosterol, showed no synthesis. The question is still open.

Synthetic vitamin A has in recent years joined D_2 and D_3 in competition with fish oils, but fishing is an old art likely to continue, and the fish oils which we explored in 1924-1934 will serve in nutrition for a long time.



FREEZING AND COLD STORAGE OF PACIFIC NORTHWEST FISH AND SHELLFISH

Part V - Palatability and Cold-Storage Life of Blacktip Rockfish (Sebastodes aleutianus) and Flag Rockfish (Sebastodes rubrivinctus)

By D. T. Miyauchi* and D. L. Alverson**

ABSTRACT

The initial palatability and the cold-storage life of fillets from 12 blacktip rockfish (Sebastodes aleutianus) and 12 flag rockfish (Sebastodes rubrivinctus) were determined. The initial palatability rating was acceptable for the blacktip rockfish but was low for the flag rockfish, which had a tough texture. The cold-storage life was 4 to 6 months for the blacktip rockfish and 2 to 4 months for the flag rockfish.

INTRODUCTION

A number of species of rockfish (genera, Sebastodes) are landed in commercial quantities along the Pacific coast. These fish are usually filleted, and the resulting fillets are marketed either fresh or frozen. Elliot and Osterhaug (1946) and Miyauchi and Stansby (1952) have shown that the fillets from the various species differ greatly in palatability, texture, and cold-storage keeping quality.

Among the rockfish yielding fillets that are superior in these respects is the Pacific ocean perch (Sebastodes alutus). It is caught in the deep-water trawl fishery that has been developed off the coasts of Washington and Oregon during the past several years. Along with the Pacific ocean perch other species of rockfish are occasionally taken. Among them are the blacktip rockfish (Sebastodes aleutianus) and the flag rockfish (Sebastodes rubrivinctus). This paper reports on the initial palatability and the cold-storage life of these two species.

BLACKTIP ROCKFISH: The rockfish was first recorded on the Pacific coast of the United States in 1949 during the developmental period of the Pacific ocean perch fishery (Alverson and Welander 1952). Limited numbers of blacktip rockfish are landed in the ports of Astoria and Newport, Oregon, by boats engaged in deep-water trawling. Fishermen have reported occasional good catches from depths exceeding 150 fathoms.

The body of the blacktip rockfish is deep brick-red, and the fins are edged in black. The fish may attain more than 30 inches in length and 20 pounds in weight. Smaller specimens, from 13 to 20 inches, are at times confused with Pacific ocean perch; however, the blacktip rockfish may be distinguished by its white body-cavity lining (peritoneum), since that of the Pacific ocean perch is always black.

FLAG ROCKFISH: The flag rockfish has been recorded as ranging from San Diego north to the Strait of Juan de Fuca. Fishermen have, however, reported taking good quantities from the Hecate Strait trawl grounds. This species generally inhabits moderate depths, but is found in water ranging all the way from 50 to 200 fathoms.

The flag rockfish is one of the most colorful members of the genus Sebastodes, being set off by brilliant carmine-red stripes on a pale-pink to white background.

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Individuals may attain a length of 24 inches or more. Those landed by the trawl fishery generally average somewhat larger than the Pacific ocean perch.

PROCEDURE

Twelve specimens each of blacktip rockfish and flag rockfish, caught by the U. S. Fish and Wildlife Service's vessel John N. Cobb and landed iced in excellent condition, were frozen in the round at Astoria, Ore. The fish were then shipped to the laboratory at Seattle, Wash., where they were thawed and filleted. Three fillets of each species were used in the initial organoleptic examination; the remaining fillets were wrapped in MSAT[1/] cellophane, refrozen, and stored at 0° F. At intervals of about 2 months, 2 or more packages were taken from cold-storage, and the fillets were examined organoleptically after being thawed and again after being cooked.

RESULTS

In the initial organoleptic examination of the blacktip rockfish, the fillets were judged normal in appearance, flat in flavor, slightly sweet in odor, and coarse, fibrous, but tender in texture. No change in quality was observed in the fillets after 2 months of storage. After 4 months, the fillets were sweet in odor and flat in flavor, and the surfaces of the fillets were moderately discolored. After 6 months, the fillets were poor in appearance, slightly rancid in flavor, and fair to poor in texture; they were judged unacceptable.

In the initial organoleptic examination of the flag rockfish, the fillets were judged normal in appearance, flat in flavor, slightly sweet in odor, and somewhat tough or rubbery in texture. Because of the undesirable texture, these fillets received a low acceptability rating. No changes in quality were observed in the fillets after 2 months of storage. After 4 months, the fillets were darker in color, strongly sweet in odor, and moderately tough in texture. The light meat was flat in flavor, and the dark meat was rancid. The samples were judged unacceptable.

Although these fish had been frozen when first caught, and then thawed, filleted, and refrozen, this handling, which differs from usual commercial procedure, could have had no effect on the changes such as oxidation, rancidity, and discoloration, the development of which were the principal causes for the short storage life.

SUMMARY

On the basis of results with a limited number of fish (12 per species), fillets of blacktip rockfish have a storage life of only 4 to 6 months at 0° F., and fillets of flag rockfish are not suitable for freezing.

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1/ Moistureproof, heat sealing, anchored coating, and transparent.



FISHERY TECHNOLOGICAL RESEARCH PROGRAM

Usually, in June of each year, representatives of the fishery and allied industries and personnel of the Technological Section of the Service's Branch of Commercial Fisheries meet in Washington, D. C., to discuss the progress of projects during the past year and to suggest projects for the new fiscal year's program. This year, as a result of program planning for the research initiated under Public Law 466, usually referred to as the Saltonstall-Kennedy Act, the Washington office personnel of the Section and the Chiefs of the four Technological research laboratories met with industry members as the need arose throughout the year to discuss the development of a fishery technological research program for fiscal year 1956. These meetings, together with the continuing contacts with industry at each of the laboratories, supplemented the usual annual meeting and assisted the Service in formulating a sound research program based on national interest.

At the Technological Section Conference of laboratory heads on June 14, 1955, in Washington, D. C., the progress on projects during fiscal year 1955 was reviewed. Then, the technological research program for the fiscal year 1956 was discussed, together with the contracts negotiated as a result of the research conducted under Public Law 466. The basic program thus arrived at, plus the necessary liaison on these research contracts, constitutes the research program for fiscal 1956.

This article consists of:

1. A summary of the progress on technological research projects for fiscal year 1955.

2. A list of reports issued by the Technological Section during the year.

3. A list of the research projects now under contract.

4. The new program for fiscal year 1956.

Technological research is carried out in four field laboratories located in East Boston, Mass., College Park, Md., Seattle, Wash., and Ketchikan, Alaska. The Alaska laboratory is sponsored jointly by the U.S. Fish and Wildlife Service and the Fisheries Experimental Commission of Alaska. University and industrial fellowships are maintained in all laboratories. Limited laboratory facilities are available by contract for university, State, or industry-sponsored projects. Several such projects are now under way at these laboratories. Results of any such research becomes public property and is available to the entire industry.

Part I - Progress on Fishery Research Projects During Fiscal Year 1955 1/

NUTRITION:

1. Investigation of the Toughening of Frozen Blue-Crab Meat: There is very little information available to guide the crab-meat packers in proper techniques for the freezing preservation of their products. Attempts to hold blue-crab meat in frozen storage have not been successful except for very short periods. Research on this problem was transferred from the Department of Chemistry to the Department of Zoology at the University of Maryland during the first month of this fiscal year. Two graduate students have been working on the project, spending most of their time investigating the histology of raw, chilled, and frozen crab meat. Since the first student found it necessary to withdraw from the fellowship within a few months, little was accomplished. The second student expects to spend considerable time this summer on the project. Factors he is investigating are the bound and unbound water and normal distribution of minerals and various organic substances of fresh and commercially-processed crab meat.

(College Park)

2. Chemical and Physical Properties of Fish and Shellfish Proteins: Work on a new method for determining cook drip in fresh and frozen fish and shellfish was completed during the year. The method was found to give reproducible results with a good degree of precision.

By the use of this method, it was found that the cook drip from fresh fish increases rapidly with storage time. In the case of frozen fish, it was found that a sharp increase in cook drip takes place immediately after the fish are frozen. The cook-drip values then remain nearly constant when the fish are held in frozen storage.

(Seattle)

3. Determination of Chemical Changes in Fish Protein During Freezing and Storage: Deterioration in quality of frozen fishery products is due, in part, to the fragile nature of meat structural proteins. It has been demonstrated that the major structural protein of fish muscle--actomysin--is particularly subject to changes generally classified as "denaturation."

In an attempt to gain a better understanding of the adverse effects of freezing and cold storage on the quality of fish protein, resulting changes in the protein structure of the actomyosin fraction of fish muscle are being investigated. A study is in progress of the relationship between viscosity, solubility, and chemical reactivity properties of fish-actomyosin systems that have been subjected to frozen storage. In this manner it is hoped to obtain a clue as to the nature of the change in fish protein resulting from frozen storage.

(Ketchikan)

4. A Comparison of the Nutritive Value of Fish and Meat: During the past several years metabolism trials have been conducted with coeds under a cooperative project with the College of Home Economics at the University of Maryland. A basal diet has been developed containing only ten grams of protein daily. The girls, for a period of $7\frac{1}{2}$ weeks in the fall of 1954, consumed this low protein diet to determine how effectively fish protein compared to beef would replace the protein loss. One group was fed haddock protein in increasing levels. Another group received beef protein at the same levels. Complete collections of excreta and samples of food were taken to determine nitrogen balance. Also, venous blood samples were taken at intervals to determine the relative hematopoietic value of these two protein sources. These results confirm previous reports which indicated no differences in the blood-forming ability of fish protein compared to that of meat.

1/ A discussion of the Fishery Technological Research program for fiscal year 1955 (July 1, 1954 to June 30, 1955) appeared in Commercial Fisheries Review, vol. 16, no. 8 (August 1954), pp. 12-26. The city at the end of each project report indicates the Service laboratory that is conducting the work. (The complete address of each laboratory is shown in the Technological Section's Organizational Chart on page 40.)

Analyses of the foods to determine their caloric value are under way at the present time. Information on caloric value is needed to determine the role of calories in the diet on the economy of utilization of protein. This work will be continued.

(College Park)

5. Sulfide Discoloration in Canned Tuna: This is a collaborative project with the Continental Can Company. The experimental work on this project, which was an investigation of the production of iron sulfide discoloration in canned tuna, has been completed. The work will be published in a series of papers, which are now being edited. Work during the past year has shown that: (1) the amount of free sulfide in a can of tuna has no direct relationship to the amount of iron sulfide deposited on the can; (2) the tendency for tuna to cause can discoloration is increased as the length of time that the raw fish are held in cold storage is increased; (3) either free water or free oil must be present in canned tuna before discoloration will take place; and (4) the mechanism whereby elemental iron in the can is converted to the ferrous form is the controlling factor in can discoloration.

(Seattle)

6. Feeding Studies with Gums Extracted from Irish Moss: Gums are being extracted from Irish Moss and derivatives of these could be used in many foods and pharmaceutical preparations. Very little applicable data are available on nutritive value and wholesomeness of these marine-plant products. Such data are required by Federal and state regulatory officials before new products are permitted to be used. Data are also needed to indicate the best use of a natural resource growing in fairly limited areas. The experimental work has been completed, including the histological studies of animals by Dr. John A. Wagner, Medical School, University of Maryland. The first draft of the manuscript has been completed and it should be ready for publication very shortly. A cursory examination of the data indicates that the gums of Irish Moss are wholesome as a food.

(College Park)

REFRIGERATION:

1. Freezing Fish at Sea--New England: Following its annual overhaul, the Service's research trawler Delaware left for its first cruise of the season on June 29. Six cruises were made, during which fish were brine-frozen for studies at the laboratory to determine storage characteristics. Some of the fish were used as raw material for precooked frozen fish sticks in another project. The vessel was transferred to the Exploratory Fishing and Gear Development Section in December. However, since the vessel is still based at the East Boston Fishery Technological Laboratory, it has been possible to obtain various lots of fish, brine-frozen or iced, for continuation of this project. As a result of circumstances in which brine-frozen fish were obtained but no control lots of iced fish of the same species could be prepared, the storage tests that were planned for several varieties of fish were delayed. Only recently have these varieties, such as ocean perch, hake, whiting, and pollock been obtained and placed in frozen storage. It still has been impossible to obtain cod for these tests.

Automatic controls were installed on the absorption refrigeration system aboard the Delaware during the year. Where it was formerly necessary to have an attendant present at nearly all times to operate the system, the automatic controls now make it possible to have the machinery operate for long periods without attention.

(Boston)

2. Quality Standards for Haddock Fillets: A rough draft of proposed voluntary Federal grade standards for frozen haddock fillets was prepared. Further studies on the project were discontinued in favor of work on grade standards for frozen fried fish sticks.

(Boston)

3. Manual on the Refrigeration of Fish: After the assignment of this project to the Boston laboratory, active work on the preparation of this manual was not begun until nearly the middle of the fiscal year. A refrigeration engineer was employed to write certain chapters dealing with

refrigeration machinery, cold-storage plants, freezing operations, etc. The preparation of other chapters has been assigned to certain personnel of the various technological laboratories. Chapters completed in rough draft so far are: 1. Introduction; 2. Historical Background; 3. Cold Storage Design and Equipment; 4. Refrigeration Machinery and Installation; 6. Relation of Physical-Chemical Components to the Refrigeration of Fish; and 7. Spoilage of Fish Prior to Freezing. Due to the press of work on other projects, particularly those initiated with funds resulting from Public Law 466, the remaining chapters are not yet completed. Those portions now in rough draft will be published soon as separate parts of the manual. The remaining chapters will be released as they are completed.

The refrigeration engineer at the Boston laboratory has spent considerable time obtaining background information on the project, conducting tests to obtain technical data on freezing rates for fishery products under various conditions, and other matters pertinent to the project.

(Boston)

4. Cold Storage Life of Fish:

A. STUDIES ON FROZEN PACIFIC OYSTERS: Studies on the freezing characteristics of Pacific oysters are being conducted in cooperation with The Refrigeration Research Foundation.

When using a modification of the AOAC method for determining free liquor in fresh oysters, the following variables showed surprisingly little effect on the amount of drip formed during freezing and thawing: (1) "Cut" or damaged vs. whole oysters, (2) freshness of oysters, (3) blowing time, (4) thawing temperatures, (5) total thawing time. Commercially-frozen oysters were found to have considerably more drip than the experimentally-frozen oysters.

It is believed that the method used may not be measuring the actual free liquid present in the oyster accurately. An attempt is now being made to evolve a more satisfactory method of drip measurement for oysters that have been frozen.

Exploratory work is in progress on the use of antioxidants to preserve the flavor and color of Pacific oysters during frozen storage and to study the problems involved in producing a satisfactory frozen breaded oyster product.

B. COLD STORAGE LIFE OF FRESH-WATER FISH: Studies on the frozen storage life of certain fresh-water fish are being conducted in cooperation with The Refrigeration Research Foundation.

Cold-storage-life tests were completed on 1 batch each of 6 species of fresh-water fish. White bass, yellow perch, and sheepshead after 12 months of storage at 0° F., and crappie after 9 months of storage at the same temperature, showed no significant changes in quality and were rated acceptable to good. Despite initial poor texture and flavor, Utah chub had changed very little during 12 months of storage at 0° F. Lake Michigan chub was found to have received approximately equal protection when frozen covered with water or water solutions of various antioxidants.

Freezer storage studies are continuing on 6 species of fresh-water fish. More extensive work on the frozen storage of lake herring is being outlined for next year.

(Seattle)

PROCESSING AND PRESERVATION:

1. Development and Evaluation of Food Products from Alaska Fish: Progress on this project was limited for the most part to work of an exploratory nature due to the lack of experienced personnel. A home economist, hired for the summer of 1954, prepared and tested several fish recipes to determine their suitability for use as precooked frozen products. Frozen precooked chum salmon pie, chum salmon chowder, clam fritters, clamburgers, crab--Alaska fisherman's style, and crab chow mein were considered worthwhile for additional developmental work. Preliminary trials with precooked halibut steaks indicated that the storage life of such a product would be short and that further developmental work was necessary. Frozen precooked fish sticks prepared from local

cod were found to be of equal or superior quality when compared with commercial sticks prepared from cod from another area. Experimental work was started to determine the canning characteristics of smoked sablefish. No significant differences in over-all quality were found between packs prepared from large (over five pounds) and small (five pounds or under) fish. Further work is planned to improve the soft oily texture of canned smoked sablefish. Storage tests with canned smoked-salmon caviar spread have shown that the spread tends to develop a strong oily flavor. A test series was prepared in which an antioxidant (Sustane 6) was added to the regular spread ingredients as a possible protective agent against the development of the off-flavor. Results of the test indicated that there was a slight, but definite, advantage in the use of the antioxidant.

(Ketchikan)



Fig. 1 - Determination of chlorides in a sample of Gulf of Mexico oysters.

2. Processing Oysters from the Atlantic and Gulf Coasts: Oysters grown along the Gulf and South Atlantic coasts have a distinct, rich, pleasing flavor, but differ considerably in texture and color from those grown on the Northeast Coast. The texture is soft, smooth, and yielding in the fresh state. Because of the soft texture, any manipulation of the oysters on freezing and defrosting tends to disintegrate the meat and increase the drip. These factors have severely restricted the area in which the Southern oyster can be successfully marketed. In spite of the entirely different technological problems

of the Southern oyster industry, there has been almost no study of these problems. The situation is aggravated by the fact that most of the plants are quite small and the operators are less well equipped to help themselves.

Contracts have been negotiated with the University of Florida at Tallahassee; Tulane University, New Orleans; and Louisiana State University, Baton Rouge, La., to conduct work on this project. (See contracts list elsewhere in this article.) Samples of shell stock and shucked oysters have been collected in the South Atlantic and Gulf coasts at monthly intervals since last November. Chemical analyses have been made of these oysters at the College Park laboratory. Preliminary studies indicate a seasonal gain in dried solids, fat, protein, and carbohydrate, confirming a local opinion that the general condition of Southern oysters improved throughout the winter and early spring.

(College Park)

3. Keeping Quality of Chilled Dungeness Crab Meat Packed in Hermetically-Sealed Metal Containers: This project was initiated to determine the keeping quality of both fresh and thawed (previously frozen) dungeness crab meat packed in hermetically-sealed metal containers when stored at temperatures above 32° F. The data obtained on keeping quality will provide a basis for formulating government-purchase specifications and for preparing recommendations to the industry.

Organoleptic, bacteriological, and chemical (pH, volatile-reducing substances, and volatile nitrogen) tests have been carried out on crab meat held at 40° F. The experimental work has shown that the storage life of the samples of crab meat which have been studied to date has varied widely among the samples from different plants and even among the samples from the same plant taken on different dates.

To date no determinations, either bacterial or chemical, have indicated imminent spoilage before it is obvious by organoleptic examination.

A short study was made of the effect of the brine-washing procedure, as practiced in a commercial plant, on the bacterial load of the crab meat. Bacterial counts showed that the load was reduced significantly after brining. This would seem to indicate that a strong salt solution is effective in destroying large numbers of bacteria.

(Ketchikan)

ANALYSIS, COMPOSITION AND SPECIFICATIONS:

1. Composition of Fish: The first analyses of the important Great Lakes fish, lake herring (Leucichthys artedi), of which we have any record, was carried out on samples taken in Lake Superior in December 1954. The edible meat of these fish contained an average of 81.2 percent moisture, 1.48 percent oil, 17.0 percent protein, and 0.99 percent ash. For 16 individual fish, the oil content ranged from 0.86 percent to 2.87 percent and the protein content from 15.6 percent to 19.5 percent.

Analyses on siscowet lake trout (Cristivomer namaycush siscowet), caught in Lake Superior in September, showed these fish to contain the highest oil content and the lowest protein content of any species ever encountered in the experience of this laboratory or anywhere in the literature. One fish contained, in the edible portion, 49.3 percent oil and only 5.9 percent protein. For the edible portion of 10 individual fish analyzed, this species averaged 24.9 percent oil, 13.1 percent protein, 62.1 percent moisture, and 0.84 percent ash.

Proximate composition was determined for 16 species of trash fish taken in the Gulf of Mexico as a part of the study of their suitability as fur-animal food.

The study of the variation in chemical composition of fish with the area in which the fish was taken was continued using sheepshead (Aplodinotus grunniens) as the test species. Sheepshead obtained from Midwest lake and river sources are being used for this comparative study. The composition, especially the oil content, showed wide variation, depending upon the source of the fish.

(Seattle)

2. Determination of Oil in Fish Meal: A series of experiments was started to determine the value of a modified acetone extraction procedure for extracting oil from fish meal. This method, developed previously, involves use of a mixture of acetone and water for the oil extraction. The samples of freshly-prepared cod-fillet-waste meal and herring meal were stored and the oil content determined at storage intervals, using both the modified and the usual acetone extraction procedures. The modified procedure proved to be superior for extraction of oil from both of these meals. The modified procedure will now be tried on a meal prepared from some species of fish which contains a highly unsaturated oil. It is planned to carry out this experiment this fall, using pilchard meal.

(Seattle)

3. Fish Sticks--Storage Characteristics and Quality Standards:

A. STORAGE CHARACTERISTICS: Only very recently have the producers of the popular fish stick had to worry about storage problems. Under present competitive conditions, some processors now have been reporting a considerable inventory of the product. Studies on the storage life of variously-prepared commercial packs of cod and of haddock fish sticks and of laboratory-prepared fish sticks have been under way for almost a year and should be completed by September 1955.

The studies indicate that only lean fish may be used for sticks if an extended storage life is desired. Pollock, ocean perch, and possibly other intermediately oily fish may be used for the institutional trade that involves a rapid turnover. No significant differences have been discerned in storage life of fish sticks attributable to the various commercial breading materials tested. The overwhelmingly important factor in determining the storage life and acceptability of fish sticks has been found to be the quality of the fish-fillet block used for preparing the sticks. The quality of the fish-fillet block is determined by: (a) freshness of the fillets used for the block; (b) adequate packaging of the block to protect the quality; and (c) the time the blocks are in frozen storage.

Losses during the processing of fish sticks may be minimized by: (a) rigid and exacting requirements as to the dimensions of the blocks; (b) development of a standardized block which would require the minimum number of cuts to produce the fish sticks; (c) use of a saw blade properly designed to minimize sawdust; (d) or reducing the sawing of fish blocks to an absolute minimum by substituting machines which guillotine or score the fish blocks into fish sticks; (e) use of short cooking times at high oil temperatures; (f) continuous clarification of cooking oil by recirculation through a filtering mechanism; (g) removal of excess batter prior to breading the fish sticks to prevent lump-formation in the breading mechanism; and (h) removal of loose breading from fish sticks to prevent accumulation of charred breading in the hot cooking oil.

B. VOLUNTARY GRADE STANDARDS: A draft of Proposed Voluntary Standards for grade and Condition of Frozen Fried Fish Sticks was completed and submitted to tne fishing industry for review and comment.

C. OBJECTIVE TEST FOR STANDARDS DEVELOPMENT: Chemical methods of determining the amount of breading on frozen fish sticks seem to be ruled out at this time. The chemical composition of the fish and sticks does not seem to suggest any special characteristics of each which could be used as a basis for an analytical method. Further study will be made to apply physical methods of separating the breading and the meat so that a percentage evaluation can be made.

Preliminary tests have been carried out on the possible application of x-rays in the detection of bones and voids in fish blocks and for the detection of bones in fish fillets.

A research contract has been given to the Massachusetts Institute of Technology for studies on the development of new objective tests for quality of fresh and frozen fishery products.

D. PRODUCT STANDARDS: The development of voluntary Federal standards for frozen fish blocks and frozen ocean perch fillets has been assigned to this laboratory. Very preliminary work has been started on the fish-block standards.

(Boston)

4. Preparation and Storage Characteristics: A study was made of the changes that occur during frozen storage at 0° F. in both raw and fried fish sticks experimentally made from orange rockfish (Sebastodes pinniger) and commercially made from Pacific halibut (Hippoglossus stenolepis), Atlantic cod (Gadus morhua), and Pacific cod (Gadus macrocephalus). At intervals during the frozen storage tests the raw fish sticks were cooked in deep fat and the fried fish sticks were heated in the oven prior to serving. Organoleptic examinations made over a period of 33 weeks indicated that: (1) orange rockfish sticks acquired an undesirably strong fish flavor after four weeks of storage; and (2) the storage life of the commercial fish sticks mentioned above depended to a large degree on their initial quality. Fish sticks that had high initial quality were still good in quality at the end of 33 weeks of storage at 0° F.

A. VOLUNTARY GRADE STANDARDS: Work was started on April 1, 1955, to study the development and application of voluntary standards of grade and condition in the production and distribution of selected fishery products on the Pacific Coast. Initial studies have included the application of the proposed voluntary standards for fish sticks and specific problems in Pacific Coast production related to differences in the quality of precooked fish sticks. After a survey of the fish-stick production facilities and problems on the Pacific Coast, laboratory work was started on these two phases of fish-stick production and distribution problems: (1) Storage tests, at 0° F., of precooked fish sticks produced from Pacific cod (Gadus macrocephalus); and (2) Study of qualitative changes in the frying oil during production, and the effect of these changes on the quality of the product.

An initial study of tuna at different stages of spoilage is in progress at the Seattle laboratory. A separate study of the reliability of certain objective chemical tests for determining the freshness of fish was started in May 1955, under a research contract with the School of Fisheries, University of Washington, Seattle.

(Seattle)

5. Quality Standards: The Service has been requested by the fishing industry to investigate the possibility of developing quality standards for certain fishery products. This project is part of the Service program for the development of voluntary Federal standards of grade and condition for fishery products. Standards are needed to facilitate marketing and to improve the general quality of fishery products. A staff member of the College Park laboratory has been studying the requirements for these standards and gathering background on the methods for and needs of an inspection and grading service. Background information essential to the training of graders of fishery products is also being accumulated.

(College Park)

6. Investigations of Canned Maine Sardines: This research study was sponsored by the Maine Sardine Tax Committee through a contract with the Service. The purpose of the project was to carry out research and compile technical data for the development of standards of grade for canned Maine sardines ($\frac{1}{4}$-oil pack) and for the improvement of inspection methods and packing processes. A set of Proposed Standards of Grades of Canned Maine Sardines was prepared and accepted by the Tax Committee. Data were collected for six packing procedures used by the Industry and used as a basis for the development of the standards. In addition, the data obtained indicated: (a) the optimum fill-in weights of fish and oil; (b) that the salt used by the industry was entirely satisfactory; (c) that under normal conditions sardines handled without refrigerated brine should be packed and processed within 24 to 30 hours after they are landed aboard ship. Tests to determine suitable processing time in retort are in progress. The Service phase of the project was discontinued at the end of the contract period (April 1955). Standards work is being continued by the Maine Sardine Industry at its Research and Quality Control Laboratory in Orono, Maine. During the next fiscal year the standards will be applied on a voluntary basis as a control measure to evaluate the quality of products being produced and to encourage production of high-grade products.

(Boston)

8. Federal Specifications for Fishery Products: Work was carried out on the following specifications as indicated:

PP-S-311 Shrimp, Canned; and PP-S-316a Shrimp, raw and cooked; chilled and frozen. The specifications were developed and issued as Interim Federal specifications.

PP-C-516 Crab Meat, Fresh and Frozen. The proposed revision was prepared and is ready for industry review and consideration for preparation as an Interim specification.

PP-C-651 Crab Meat, Canned. The proposed revision was prepared by the Service and submitted to the Quartermaster Food and Container Institute for incorporation of Armed Forces general and packaging requirements.

PP-S-516 Sardines, Canned. The proposed revision was prepared and submitted to the QMF&CI for incorporation of Armed Forces comments. Copies were distributed to the fishing industry for preliminary review.

PP-O-951 Oysters, Canned. Data are being collected by the Service laboratories for use in developing the Federal specification.

(Boston)

INDUSTRIAL FISHERY PRODUCTS:

1. Vitamin Content and Nutritive Value of Industrial Fishery Products: The mixed feed industry has been concerned about possible variations in nutritive quality since these may be directly related to the performance of their product, which must be guaranteed to the poultry or swine feeder. Research is needed to determine factors affecting the nutritive quality of fishery industrial products, such as fish meal, fish oil, condensed fish solubles, and homogenized condensed fish. A considerable number of bio-assays have been conducted during the past year to determine the relative quantity of unidentified growth factors in fish meals, condensed fish solubles, and dried solubles. The data have not yet been summarized for publication and the work is continuing. A limited number of chick-feeding tests have been completed during the past year to determine whether processing factors may be responsible for apparent variations in nutritive quality of various lots of fish meal. In addition, contracts have been let to a number of institutions to do research on various phases of this project, particularly feeding studies with chickens and swine, to determine if variability in nutritive quality exists. Chemical evaluation analyses will be made on many samples, either produced in a portable reduction plant under closely-controlled conditions, or taken by staff members from regular production of known history in commercial plants.

(Seattle and College Park)

2. Quality Index of Fish Meals: A literature review on factors that may affect the quality of processed feeds is being compiled. This review was undertaken to obtain information that will aid in the development of methods of analysis that will indicate the nutritive value of fish meal. Resumes of approximately 300 articles have been prepared, and about 100 more will be abstracted later. The following parts have been prepared in preliminary form:

Part I. Factors that affect the overall nutritive value of a product.

Part II. Factors that affect the digestibility of a product.

Part III. Effect of raw material on the quality of the product.

Part IV. Protein and its relation to the quality of the product.

Part V. Amino acids and their relation to the biological and nutritive value of the product.

Part VI. Fats, fatty acids, and their relation to the quality of the product.

Part VII. Effect of processing methods on the quality of the product.

Part VIII. Effect of storage on the quality of the product.

Part IX. Methods applicable to the determination of the nutritive value and quality of a product.

When the literature survey and critical review are completed, the material will be published.

Preliminary work was started on the use of oil extraction of fish meals as a

possible method to indicate the quality of the meal. The question to be answered is whether the decrease in the amount of ether extractives, which occurs during prolonged storage, is an index of a change in the nutritive value of the meal. These determinations are to be continued over a long storage period, and the results correlated with nutritive value as determined by chick tests.

(Seattle)

3. Nutritive Value of Fishery Products for Feeding Fur Animals: Several samples of small fish taken in shrimp trawls and from other sources have been analyzed to determine proximate composition and thiaminase content. Feeding studies with rats have been continued throughout the year to determine the nutritive quality of menhaden press cake. Up to the present time, three generations of rats have been raised on a diet consisting of menhaden press cake, cabbage, and a high calorie diet made up of starch, fat, and cod-liver oil. No difficulty in handling the animals has been experienced with feeding of the frozen press cake. During this summer, the thiaminase content of whole menhaden and menhaden press cake will be determined. Thiaminase, if present, must be in rather small concentrations since cabbage has been the only source of thiamin in the diet consumed. The data from these feeding tests are needed to determine the value of these products for feeding fur-bearing animals, particularly mink. The sources of animal protein for fur-bearing animals have traditionally been horse meat and certain beef organs. These are now in very short supply so the fur farmers are looking for fishery products that can supply their needs.

(College Park)

4. Production of Dried Solubles: For the past three years, research has been undertaken on the production of dried solubles. Dried solubles have been prepared, with and without additives, using for raw materials approximately 30 samples of commercially-prepared condensed menhaden solubles. It was found that none of the dried solubles was entirely satisfactory, since all were hygroscopic and caked during storage. Approximately one-third of the samples could be processed into dried solubles that had a reasonably good storage life when packed in multi-wall paper bags. A statistical analysis of data is now under way to determine factors affecting the quality of the end products. The experimental work has been completed and the data will be summarized for publication within the next few months.

(College Park)

5. Proximate Composition of Marine and Fishery Products of Alaska: The proximate composition of samples of Alaska shrimp waste, sablefish, herring, cutthroat trout, sea lion, whitefish, and of experimental feeding rations from the Experimental Fur Station at Petersburg have been reported. There has been considerable interest this year concerning the possibility of using sea lions for fur-animal feeding purposes. At the request of a large fur-farm operator in Wisconsin, four sea lions were obtained and the proximate composition of samples of meat, liver, and blubber was determined. Analyses for riboflavin, niacin, and vitamin B_{12} are currently being conducted at the Seattle Technological laboratory on samples of the liver and meat. Mineral constituents such as iron, calcium, phosphorous, and iodine are currently being determined on samples of Alaska shrimp waste and seaweed (Fucus sp.).

6. Study of Pharmaceutical and Other Industrial Products from Salmon Eggs: THE FATTY ACIDS OF SALMON EGG OILS: The component fatty acids in the oil from salmon eggs have been determined. Forty-six percent of the fatty acids are 20 and 22 carbon atoms in length with 3 to 6 double bonds. One-third of the total oil in the egg is present as uncombined oil. It consists primarily of the triglycerides of the fatty acid and contains most of the color. The other two-thirds of the oil is very tightly bound to the protein and is 50 percent phospholipid material, probably mostly lecithin.

Commercial methods of preparing oil and meal from salmon eggs have been investigated. Enzymatic digestion followed by solvent extraction has given promising results in the laboratory. This process will be investigated further during the

next year. Samples of defatted egg meal have been prepared for fish and poultry-feeding studies.

7. Utilization of Waste Materials from Fish Frozen at Sea: A lot of approximately eight tons of frames and viscera from round brine-frozen haddock was processed into fish meal at a commercial plant, using the wet reduction process and hot-air drying. The yield of meal was 18.2 percent. A similar lot of waste was processed commercially, using the dry reduction process and vacuum drying. In this instance the yield of meal was 19.5 percent. No particular problems were encountered in processing these lots of waste from brine-frozen fish over those normally encountered in usual reduction-plant operations. Several lots of meal have been prepared from waste from brine-frozen haddock by a solvent-extraction process. The waste from brine-frozen ocean perch, whiting, and cod has also been processed into meal on a laboratory scale. Statistical analysis of the data from the feeding of these haddock-waste meals to chicks will be completed shortly. The nutritive value of other fish-waste meals similarly tested is being evaluated.

(Boston and College Park)



Fig. 2 - Microbiological assay of fish meal samples for B vitamin.

8. Vitamin Analyses of Fish Meals and Other Fishery Products: Except for preparation of the final report, this project has been completed. During the year analyses of protein, oil, moisture, riboflavin, nicotinic acid, and vitamin B_{12} have been carried out on 30 samples of herring products, 13 of menhaden, 64 of salmon, 28 of tuna, 8 of mackerel, 6 of crab, and 8 of miscellaneous species. A comparison was made of the vitamin contents of fish solubles prepared in four different ways. A sample of drum-dried solubles prepared by a non-acidified process and containing the original oil showed no loss of riboflavin or nicotinic acid. When oil was separated from the solubles, the oil contained a high proportion of the nicotinic acid. The drum-dried solubles contained more of the vitamins than did solvent-dried solubles.

(Seattle)

9. New Products from Fish Oils: Work on the separation and purification of fish-oil fatty acids by the urea-fatty-acid-complex procedure is continuing. The procedure has been applied to the separation of poly-unsaturated fatty acids (iodine value 350) from salmon-egg oil and also to the separation of hydrogenated salmon-egg-oil fatty acids. The fatty acids obtained from these separations are being used in the preparation of new chemical products, including long-chain alcohols, halides, and silicone derivatives.

A report on the preparation of silicone derivatives from long-chain fatty acids is being prepared for publication.

(Seattle)

10. New Uses for Fish Oils: This project began in March 1955. The first work carried out concerns the separation of glyceryl ethers present in the unsaponifiable fraction from fish-liver oils, especially dogfish-liver and ratfish-liver oil. The principal glyceryl ethers occurring in liver oils are batyl alcohol, chimyl alcohol, and selachyl alcohol. Recent published reports indicate that the glyceryl ethers, particularly batyl alcohol, may have definite uses as pharmaceuticals.

A new method for obtaining the individual glyceryl ethers has been developed, based upon their ability to form urea complexes. This work is nearing completion, and a report will be prepared in the near future.

(Seattle)

11. Unidentified Growth Factors: The preparation of concentrates of the unidentified growth factors in fishery by-

products was continued during the year. The concentrates were assayed by use of both rats and micro-organisms. Concentrates prepared from menhaden meal gave good microbiological growth response.

Experiments designed to evaluate the growth effects of the inorganic substances present in the unidentified-growth-factor concentrates are being started.

(Seattle)

Part II - Reports by the Technological Section During Fiscal Year 1955

COMMERCIAL FISHERIES REVIEW:

Cold-Storage Life of Fresh-Water Fish--No. 1, by D. T. Miyauchi, vol. 16, no. 9 (September 1954), pp. 18-20 (Sep. 377).

Vitamin Content of Fishery Byproducts: Part 2 - Vitamin B_{12} in Pacific Sardine (Sardinops caeruela) Organs and Riboflavin, Nicotinic Acid, and Vitamin B_{12} in Albacore Tuna (Germo alalunga) Organs, by Neva L. Karrick, vol. 17, no. 2 (February 1955), pp. 8-11 (Sep. 373).

Freezing and Cold Storage of Pacific Northwest Fish and Shellfish: Part IV - Storage Characteristics of Four Species of Salmonidae, by M. Heerdt and M. E. Stansby, vol. 17, no. 3 (March 1955), pp. 13-17 (Sep. 395).

Determination of Cook Drip in Pacific Ocean Perch (Sebastodes alutus) and Pacific Oysters (Ostrea gigas) by Use of a New Method, by William N. Sumerwell, vol. 17, no. 3 (March 1955), pp. 18-21 (Sep 396).

Weight Range, Proximate Composition, and Thiaminase Content of Fish Taken in Shallow-Water Trawling on Northern Gulf of Mexico, by Charles F. Lee and William Clegg, Technical Note No. 31, vol. 17, no. 3 (March 1955), pp. 21-23 (Sep. 395).

How to Cook Frozen Fish Without Prethawing: Part I - An Attempt to Determine the Optimum Internal Temperature for Baked Frozen Halibut Steaks, by Kathryn Osterhaug and Marian MacFarlane. (Scheduled for publication in 1955.)

Freezing Gulf of Mexico Shrimp at Sea, by John A. Dassow, vol. 16, no. 7 (July 1954), pp. 1-9 (Sep. 373).

Keeping Quality of Chilled Dungeness Crab Meat Packed in Hermetically-Sealed Containers, by Clarence J. Carlson, vol. 16, no. 11 (November 1954), pp. 20-21 (Sep. 385).

Chemical Changes in Fish Protein During Freezing and Storage, Harry L. Seagran, vol. 16, no. 12 (December 1954), pp. 13-14 (Sep. 387).

Preparation of a Smoked Salmon Caviar Spread, by Clarence J. Carlson, vol. 17, no. 1 (January 1955), pp. 13-15 (Sep. 391).

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Study of Pharmaceutical and Other Industrial Products from Salmon Eggs, by Robert M. Kyte, vol. 17, no. 2 (February 1955), pp. 14-15 (Sep. 394).

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Is Salt a Problem in Brine-Frozen Fish?, by J. Holston, Fishing Gazette, vol. 72, no. 1 (January 1955), pp. 62-63.

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Preliminary Studies on the Utilization of Freshwater Fishery Resources of Alaska, by J. A. Dassow. Presented at the Fifth Alaska Science Conference, Anchorage, Alaska, September 1954, by J. A. Dassow.

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Freezing Fish at Sea--New England: Part 9 - Improvements in the Brine-Freezing Mechanism on the Trawler Delaware, by C. G. P. Oldershaw.

Freezing Fish at Sea--New England: Part 10 - Studies of Miscellaneous Handling Problems, by Harris W. Magnusson.

Freezing Rates and Energy Requirements for Freezing Packaged Fish Fillets and Fish Sticks in a Multiplate Compression Freezer, Technical Note, by J. W. Slavin.

The Immediate Effects of Brine Dipping Upon Fillets from Iced and from Brine-Frozen Haddock, by J. Holston and S. R. Pottinger. (This manuscript is still in the revision stage.)

Reduction of Curd in Canned Salmon Prepared from Frozen Fish: Part I - Use of Acid and Brine Dips, by J. A. Dassow and H. J. Craven. Part II - Effect of pH and Salt Content, by H. L. Seagran.

Keeping Frozen Alaska Shrimp Tender, by C. J. Carlson and J. A. Dassow.

Full Utilization of Alaska Salmon Oil, by F. B. Sanford.

Utilization of Sea Lions in Alaska, by J. A. Dassow.

Study of Pharmaceutical and Other Industrial Products from Salmon Eggs, by Robert M. Kyte.

Alaska Whitefish: Proximate Composition and Edibility, by R. G. Landgraf, Jr., and J. A. Dassow.

Preparation of Canned Smoked Chum Salmon Spreads, by R. G. Landgraf, Jr., and Christine Heller.

Quality Changes in Frozen Dungeness Crab, Technical Note by C. J. Carlson and J. A. Dassow.

Canned Smoked Shrimp, Technical Note by R. G. Landgraf, Jr.

Modified Tenderometer for Measuring Changes in Texture of Fish and Shellfish, Technical Note, by H. J. Craven.

Component Fatty Acids of Salmon Egg Oil, by Robert M. Kyte.

Part III - Saltonstall-Kennedy Contracts for 1955

Since it is not possible within the limits of the Service's facilities and personnel to conduct extensive research in all phases of technology, a portion of the research was contracted out to universities, State agenies and private laboratories in fiscal year 1955, but the research work is continued in fiscal year 1956. These contracts are under the administrative supervision of the Service's four Fishery Technological Laboratories.

CONTRACTS AND AGREEMENTS FOR 1955:

Seattle--Supervising Laboratory:

1. University of Washington, Seattle, Wash. To develop rapid chemical tests for determining freshness of fish. $9,785

2. University of Minnesota, Minneapolis, Minn. Determine the nature of the chemical reaction involved and the products formed in the development of undesirable odors during storage of fish oils. $12,190

3. University of Minnesota, Minneapolis, Minn. To obtain fundamental information on the chemical structure and methods of analyzing unsaturated and saturated acids of fish oils. $13,300

4. University of Minnesota, Minneapolis, Minn. Investigate chemistry of inclusion type complexes. Prepare and study the nature of altered fatty acids of fish oils. $13,344

5. University of Minnesota, Minneapolis, Minn. Separating fatty acids from fish oil glycerides, and preparing amines and other derivatives from fatty acids for use in iron, manganese, and other ore flotation experiments. $14,998

6. University of Southern California, Los Angeles, Calif. Development of a method for bio-assay of growth factors present in fishery byproducts. $6,820

7. Oregon State College, Corvallis, Ore. Evaluation of fish oils as supplements to swine ration. Nutritional value, study of carcasses to determine advantages or detrimental effects, especially regarding fat quality. $7,375

8. California Department of Fish and Game, Los Angeles, Calif. Improve methods of handling and freezing skipjack and other tuna at sea and study of quality differences in the canned product. $10,000

Boston--Supervising Laboratory:

1. Northeastern University, Boston, Mass. Economic analysis of freezing fish at sea in New England fisheries. Joint project with Economics and Cooperative Marketing Section. $15,000

2. Massachusetts Institute of Technology, Cambridge, Mass. Develop new objective tests for quality of fresh, frozen, and processed fish. Develop rapid analytical methods to determine fresh condition of fish. $15,900

3. University of Massachusetts, Amherst, Mass. Development of background information for voluntary Federal standard of grade for raw breaded shrimp. $14,898

4. Arthur D. Little, Inc., Cambridge, Mass. Preparation of new resins from fish oils. $16,500

College Park--Supervising Laboratory:

1. Tulane University, New Orleans, La. Investigate nature of pigmented areas and the factors involved in the bleeding reactions in the shucked oyster. $7,600

2. Louisiana State University, Baton Rouge, La. Development of a quality test for fresh and frozen oysters and the study of the changes in frozen storage. $10,000

3. Florida State University, Tallahassee, Fla. Investigate fat content and its effect on quality during frozen storage, and study variation in composition and nutritive value. Develop new oyster products. $12,367

4. Maryland State College, Princess Anne, Md. Determine partition of Kjeldahl nitrogen in fish meal and origin of protein to physiological tissues. $5,800

5. Texas A. and M. Research Foundation, College Station, Tex. Development of a method of Chromatographic analyses of the constituents of marine oils. $5,900

6. Florida Southern College, Lakeland, Fla. Use of modified or fortified fish oils as insecticides and fungicides in the citrus industry. $5,240

7. North Carolina State College, Raleigh, N. C. Determining the differences in physical-chemical characteristics of fish body oils with season, with geographical areas of production, and species. $9,700

8. University of Delaware, Newark, Del. To determine the nature and properties of the non-glyceride fractions of fish oils; literature survey on fish oil chemistry. $29,690

9. University of Cincinnati, Cincinnati, Ohio. The use of fish oils in the lubrication of leather. $16,000

10. University of Delaware, Newark, Del. Assay of fish meals for feeding quality in chick diets. $15,000

11. Reedville Oil and Guano Co., Reedville, Va. Pilot and commercial meal and oil production studies; to supply equipment, facilities, and services. $6,500

12. Storrs Agricultural Experimental Station, University of Connecticut, Storrs, Conn. Research with fish oil in poultry feeds. $8,000

13. University of Florida, Gainesville, Fla. Development of background information for a voluntary Federal standards of grade and condition for natural sponges. $6,000

Part IV - Research Program for Fiscal Year 1956

The Fishery technological research program for fiscal year 1956 (July 1, 1955, to June 30, 1956 was developed after recommendations were received from members of the fishing and allied industries. Assignment of projects was made after taking into consideration the location, facilities, and personnel at each of the Service's four Fishery Technological Laboratories and the funds available. Projects are listed by area and laboratory.

NORTH ATLANTIC (EAST BOSTON, MASS.):

1. Freezing Fish at Sea--New England: The project has been virtually completed, but will be continued only to obtain storage data on those varieties of round fish frozen in brine at sea, which were not sufficiently studied previously. The initial taste-test series for fillets of brine-frozen pollock, whiting, ocean perch, and hake, is under way. Additional information on the use of these products as raw material for frozen fish sticks is continuing. Brine-frozen cod will be obtained for storage tests as soon as possible.

An economic analysis of the brine-freezing of fish at sea as compared to the present commercial practices of icing fish on vessels will be made in cooperation with Northeastern University on a contract financed jointly with the Service's Economics and Cooperative Marketing Section.

2. Composition of Fish: Numerous requests are received for information on the proximate composition of the various species of fish that are caught in the New England area. Since information of this type is generally lacking, a study of the proximate composition of these species will be made to include the effect of season, size of fish, and other factors that may be of importance. The composition of fillets removed from the fish and the remaining waste will be determined separately. By calculation, the composition of the whole fish will then be available, as well. This investigation is being conducted in collaboration with the Service laboratories at College Park, Seattle, and Ketchikan.

This project has been extended and will include studies on the utilization of waste materials from fish frozen at sea. The search for new commercial-scale products from fish viscera will be continued. Included in this study is the separation of heparin, an anticoagulant, from fish viscera. The proximate analyses and preparation of fish wastes and trash fish into conventional fish meals will be continued. Animal feeding studies to determine the nutritive value of haddock frames and pollock scales are in progress.

3. Voluntary Federal Standards for Grade and Condition of Fishery Products:

(1) VOLUNTARY QUALITY STANDARDS FOR HADDOCK FILLETS: Background studies have already been made and the standards are in the process of preparation. They will be reviewed and sent to industry for comments when completed.

(2) FISH STICKS--VOLUNTARY QUALITY STANDARDS AND STORAGE CHARACTERISTICS (ATLANTIC COAST): The fish stick industry readily realized the desirability for developing voluntary quality grade standards if they were to maintain or even improve the quality of fish sticks. The Service, at the suggestion of the fishing industry, implemented a research program for the development of quality standards. The program on voluntary standards for fishery products will be carried out in two phases: (1) development of standards, and (2) research on product evaluation. The work on standards will include the preparation of voluntary Federal standards for grade and condition of fishery products as may be desired by the industry. Standards for fish sticks, fish blocks, and ocean perch fillets are in the process of preparation.

The research phase will include such background studies as the possibilities of using varieties of fish not now used extensively in the preparation of fish sticks, storage tests on fish blocks and fish sticks, objective tests for freshness and quality, and such other related problems as may be found necessary for the actual preparation of voluntary Federal standards of grade.

(3) VOLUNTARY QUALITY STANDARDS FOR BREADED SHRIMP: Background information on voluntary Federal standards of grade for raw breaded shrimp is being developed by the University of Massachusetts. The Service will develop the standards from the data supplied, in part, by the University.

The over-all purpose of the project will encompass: (1) specific product work as assigned to one of the four laboratories; (2) supplementation of the work of the other laboratories on their

assigned product standards; (3) the development of material for graders' training manuals; and (4) research on improvements in tests and measurements for factors significant in standards program. The standards program is being conducted in collaboration with the Service's laboratories at Seattle and College Park.

4. Flavor Evaluation in Fish: Very little information is available regarding the nature of flavor components in fish. This project will involve the identification of flavor and odor components of fish; development of a method for assay of these components; and correlation of the content of flavor components with quality or freshness of the products.

5. Preservation of Fish on Fishing Vessels: The present methods for preserving the freshness of fish aboard the fishing vessel are being reevaluated. Small-scale tests will be made to determine the effect on quality of fish prechilled in refrigerated sea water prior to placing in ice in the hold. Another approach to the problem of prolonging the quality of the fish aboard the vessel is to investigate the use of antibiotic ice. Preliminary reports indicate that small amounts of certain antibiotics have retarded the growth of many species of bacteria. The required antibiotic concentrations and method of preparing the ice will be among the objectives of the study. The experimental use of antibiotic solutions by the menhaden boats are being followed as industry tests progress to augment information being obtained by the Service.

6. Federal Specifications for Fishery Products: Specifications for fishery products will be developed in order of priority indicated by other Federal agencies. Work is first to be completed on the following specification:

PP-0-951 - Oysters, Canned. A proposed revision will be prepared for industry review and consideration for preparation as an Interim Specification.

7. Manual on the Refrigeration of Fish: Several sections of this manual assigned to personnel of the various technological laboratories have been completed and will be released as parts of a series. The remaining sections will be released as they are completed. After completion and publication of the manual the project as such will be discontinued. Revision of dated sections will be assigned to individuals, as information requiring such action is accumulated.

8. Freezing and Storage of Fishery Products: Data will be obtained on the rate of freezing of various types of packaged fishery products by different freezing methods to determine the most efficient method for the particular product. A method of freezing that is suitable for packaged fillets containing no air spaces may be found to be inefficient when used for packaged fish sticks, which may contain appreciable air space. Data on the storage of fish in a jacketed-type frozen-storage room will also be obtained to determine the advantages of this type of storage over the conventional types. Some information to be developed on this project would be for revision of sections of the Refrigeration Manual as data become available.

MIDDLE AND SOUTH ATLANTIC (COLLEGE PARK, MARYLAND):

1. Vitamin Content and Nutritive Value of Industrial Fishery Products: Work on this project will continue on a limited scale. Feeding tests at experimental and practical ration levels are being conducted on contracts financed from Public Law 466 funds as follows: The use of fish oil in high-energy poultry rations at the University of Connecticut; Chick assays of fish meal for nutritive quality of the protein at the practical ration level by the University of Delaware; Development of a bio-assay procedure to accurately determine the growth response attributable to the unknown growth factors in fish meals by the University of Southern California; The evaluation of fish oils as supplements to swine rations by Oregon State College; Bio-assay procedure for evaluating any changes in the protein quality of the raw fish, and as cooked fish, press cake, dried scrap, and fish meal during the processing cycle by the University of California; Determination of effects of raw material and processing variables on the amounts of unknown growth factors in fish meals by the University of Wisconsin.

2. Study of Nutritive Value of Fish Meal, Condensed Fish Solubles, Fish Body Oils, and Homogenized Condensed Fish: The project was expanded to include pilot-scale studies of the above-mentioned industrial fishery products and analyses of menhaden at all stages from raw fish to meal and oil. Service personnel will have available for experimental purposes a pilot plant at Reedville, Va. Through the preparation of fish meals of known history they will determine the effects, if any, attributable to condition of raw materials, and to processing and storage procedures on the nutritive value. Service studies, in addition to sample preparation and distribution, will cover in-plant observations of processing variables on a commercial scale. In addition to a limited amount of analytical work, evaluation of the research results from close liaison with the several contractors on the meal and oil research program in the Middle and South Atlantic Gulf areas will be carried on at this laboratory. The Seattle laboratory will maintain close liaison with the several meal and oil research contractors located on the Pacific Coast and Northwest area.

3. Voluntary Federal Standards for Grade and Condition of Fishery Products: This project is a part of the Service's program for the development of standards of grade and condition for fishery products. Data obtained through research will be used to draft standards of grade and condition for fishery products. The investigation will include the development of microbiological and chemical objective tests. As a grade standard for a fish product is developed, a handbook will be prepared for use in the training of workers to carry out the grading service. At

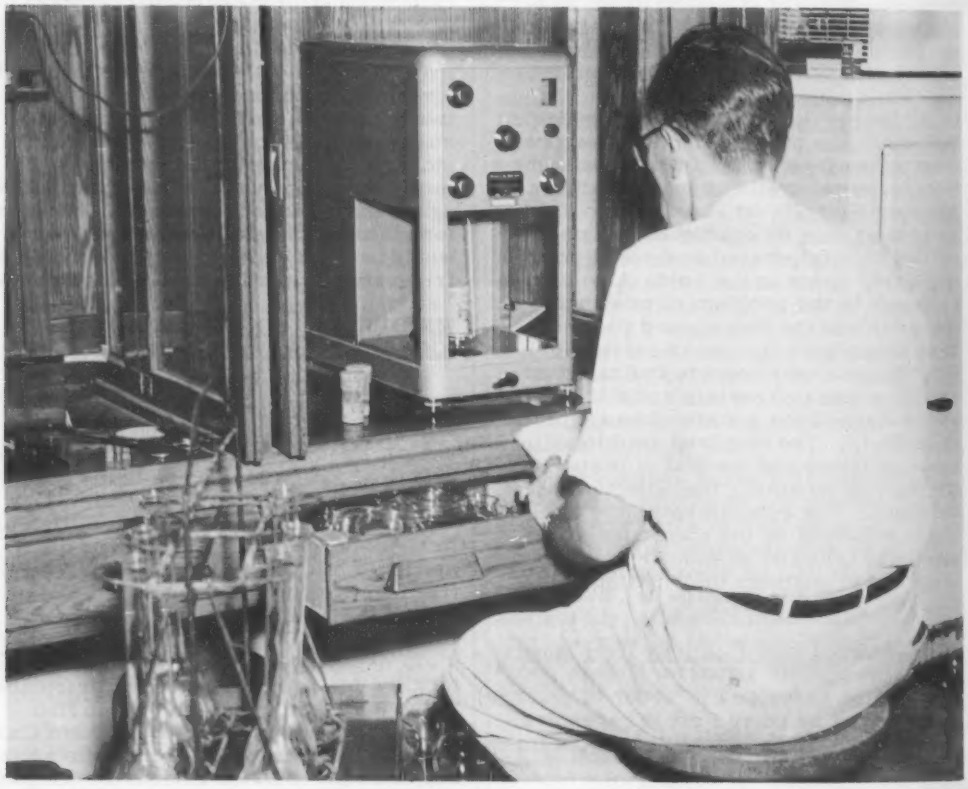


Fig. 3 - Weighing samples of oysters for determination of total protein. This is a new balance indicating the smaller weigh of one and one-tenth milligram by optical means.

present, the preparation of a voluntary grade standard for breaded shrimp is the product assignment for this laboratory. This project is being conducted in collaboration with the Service laboratories at Boston and Seattle, and with the University of Massachusetts, a contractor assigned to supply background information on raw breaded shrimp products now marketed.

4. Comparison of Nutritive Value of Fish and Meat (Cooperative Project with the University of Maryland): A preliminary examination of the data indicates that in human nutrition protein loss can be as effectively replaced with fish protein as with beef in the diet. A more detailed report will be made upon completion and evaluation of the statistical data. The project will continue, with emphasis on the comparative calorific values supplied by fish and beef in the diets used.

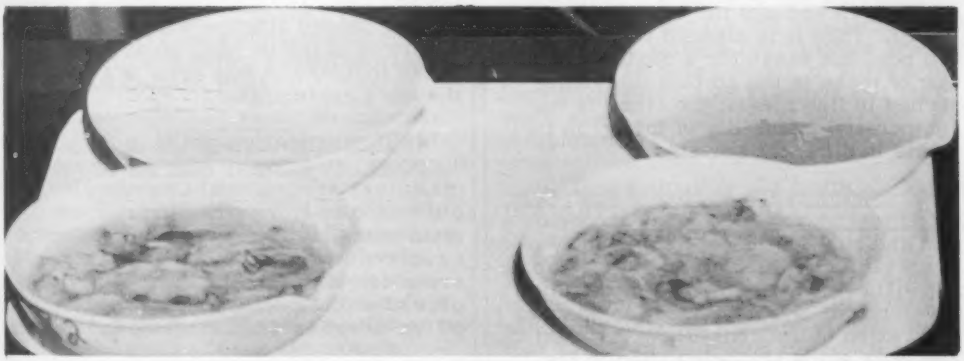


Fig. 4 - On the left are Chesapeake Bay oysters with the free liquor drained off into the adjacent evaporating dish. The right hand pair of dishes contain a similar amount of Gulf of Mexico oysters and liquor.

5. Changes in Texture of Frozen Blue-Crab Meat (Cooperative Project Sponsored by the Refrigeration Research Foundation): Continuing studies on homogenates of fresh and frozen crab meat appear to indicate a water loss in frozen meat as compared to fresh meat. There was no apparent change in pH with freezing. Further refinements in the quantitative aspects of this phenomenon, particularly in relation to duration of storage, are being presently undertaken. The quantitative determination of bound to unbound water in fresh and frozen crab meat is planned. The possibility of increasing the bound-water fraction in frozen meat through physical or chemical means is also being explored.

Histochemical studies for the determination of the normal distribution of minerals and various organic substances in frozen crab meat are continuing, and sections of muscles were processed in preparation for enzyme digestion studies. These determinations may indicate variations in the amount of one or more constituent that cause changes in the texture of crab meat due to freezing. The University plans to complete a substantial portion of these investigations by fall.

6. Nutritive Value of Fishery Products for Feeding Fur Animals: The project will be continued to supply fur farmers with data necessary for the preparation of properly-balanced rations. Freshwater fish, including sheephead, will be assayed for thiaminase.

7. Atlantic and Gulf Coast Research--Processing Oysters: The Southern oyster differs from that of the Northeast in being softer, having a lower solids content, and often having a brown color. These differences in texture make it necessary to handle Southern oysters in a different manner. They have not been successfully frozen for storage. Project will continue with some analytical work, product evaluation, and contract liaison at the laboratory. Contracts awarded include: Tulane University--investigation of the nature of pigmented areas and the physiological factors involved in the bleeding reactions in the shucked oyster;

Louisiana State University--development of a quality test for fresh and frozen oysters and of microbiological studies of oysters as harvested, handled, and processed for freezing and during frozen storage; Florida State University--investigation of fat content and its effect on quality during frozen storage and study of variations in composition and nutritive value.

PACIFIC COAST
(SEATTLE, WASHINGTON):

1. Quality Index of Fish Meals: To trace any variations in the nutritive quality of fish meal, a rapid chemical or physical test appears desirable. Before this can be accomplished, more will have to be learned about the cause of variation in the nutritive value of different lots of fish meals. A literature survey on the nutritive value of fish meals and allied feedstuffs will be carried out. Abstracts from the literature search will be critically reviewed and the compilation published. Then it is planned to investigate two possible bases for a quality index. One of these is the amount of dye absorbed in fish meals; the other is the comparative solubility of the fat in fish meals in different solvents.

2. Chemical Evaluation of Fish Oils and Investigation of New Uses: Separation and purification of fish oil fatty acids of specific chain length by urea complexing will be continued with emphasis on development of a technique for sharper separation of the constituent fatty acids. The fatty acids are being used in the preparation of new chemical products, including silicones, halides, and long-chain alcohol derivatives. Other products will be developed involving addition of groups at double bonds.

The program has been expanded and will include the following studies: (1) Development of new compounds by altering the fatty acids at various points in the structure; (2) Separation and utilization of the non-glyceride constituents of fish oils, such as glyceryl ethers. These compounds may have definite uses as pharmaceuticals. The work will be closely correlated with contract research on fish oils. Contracts awarded include: (1) Development of a procedure for separating fatty acids from fish oils for industrial or pharmaceutical use--by the University of Minnesota; (2) Development of analytical techniques for following oxidation of fish oils in fish flesh, fish meal, and processed fish oil and to find methods of preventing these processes--by the University of California. Development of pilot-scale continuous extraction equipment and procedures based on the urea complex approach will be undertaken.

3. Cold-Storage Life of Fish (Cooperative Project Sponsored by the Refrigeration Research Foundation): Work will be continued on the study of freezing and frozen storage of Pacific oysters. Principal subjects for investigation will include: (1) Development of a satisfactory method for estimating drip; (2) the use of antioxidants to preserve flavor and color during frozen stage; and (3) the preparation of a satisfactory frozen breaded oyster product. Studies of the response of the fresh-water fish of the Great Lakes and Midwest rivers to freezing and frozen storage will be expanded. A survey of the technological problems of the industry in this area is a part of the work contemplated.

4. Determination of Oil in Fish Meal (Cooperative Project with the Association of Official Agricultural Chemists): A simplified method for extracting oil from fish meal with a mixture of acetone and water as solvents was developed. Experiments are under way to determine whether this procedure can replace the more complicated two-stage extraction method of AOAC.

5. Study of Chemical Compounds Forming During Spoilage of Fish: Fish of different species, and even of the same species, when handled under varying conditions, may spoil in a variety of ways. A huge number of chemical compounds may result from these different types of spoilage. A knowledge of the types of compounds forming under different handling conditions would be of considerable value. For example, it would provide basic information needed in developing freshness tests. Once the mechanism of spoilage is known, measures to protect fish quality can more logically be developed. There might also be provided clues to the causes for differences in nutritive value of fish meals prepared from raw materials of varying degrees of quality.

The work will be carried out to determine not only the nature and types of chemical compounds forming during spoilage, but also the reasons why different types of spoilage occur under various handling conditions.

6. Voluntary Federal Standards for Grade and Condition of Fishery Products: This project is part of the over-all Service program on the development of standards of grade for fishery products approved under the Saltonstall-Kennedy program. The work will include assistance to other Service laboratories in the preparation, review, testing, and revision of voluntary standards for specific fishery products in relation to application of such standards to Pacific Coast fisheries. At present, fish sticks produced from Pacific cod and related breaded fishery products are under study for preparation of voluntary standards. When standards for products produced largely in the Pacific Northwest are to be developed, this laboratory will have primary responsibility for them. The Standards program is being conducted in collaboration with the Service laboratories at Boston and College Park.

7. Composition of Fish: Most data in the literature on composition of fish is either so old as to be of minor value, or on too small batches of fish, or even a single fish, and not applicable to fish in general. Information on composition of fish is fundamental to the solution of almost every technological problem, since it is necessary to know the makeup of the fish before applying any methods of preservation or attempting to utilize it for byproducts.

A careful sampling of each species from the Pacific Coast, Gulf of Mexico, and freshwater fish from the Great Lakes and Mississippi River, including seasonal and geographical variation, will be carried out. This project is integrated with similar studies at each of the other laboratories.

ALASKA (KETCHIKAN):

1. Proximate Composition of Marine Mammals and Fishery Products of Alaska: Information on the proximate composition of fish and marine mammals of Alaska is generally lacking. These studies will include the effect of season, size of fish, and other factors that may be of importance.

2. Development and Evaluation of Food Products from Alaska Fish: Studies on the use of antioxidants in fish spreads is continuing. Small packs of canned smoked herring niblets, canned smoked butter clams, and canned smoked pink shrimp were prepared and evaluated by taste-panel tests. The canning characteristics of smoked sablefish are being studied. Studies of the storage qualities of these specialty products and the preparation of other such products is in progress.

3. Study of Pharmaceutical and Other Industrial Products from Salmon Eggs and Fish Wastes: Previous studies on this project have shown that salmon eggs contain an oil which is highly unsaturated. In addition, they contain high-quality protein and certain growth factors for fish and poultry. Studies of the enzymatic digestion method for the separation of the oil from the protein constituents are continuing. The development of solvent dehydration-extraction methods and pilot-plant scale preparation of meal are contemplated.

4. Determination of Chemical Changes in Fish Protein During Freezing and Storage: In an attempt to gain a better understanding of the adverse effects of freezing and cold storage on the quality of the meat of fish, changes in properties of the actomyosin fraction of fish muscle that has been subjected to frozen storage are being studied. Tests are being devised to determine the rate and extent of these changes in fish protein. The results of the studies will be applied toward methods of improving the quality of frozen fishery products.

5. Keeping Quality of Hermetically-Sealed Chilled Dungeness-Crab Meat: Studies on the keeping quality of hermetically-sealed non-heat processed dungeness-crab meat stored at 40° F. continue. Representative cultures will also be isolated from fresh and frozen crab meat. The effect on the quality of crab meat of certain of the individual types of organisms isolated will be investigated.

DEPARTMENTAL (WASHINGTON, D.C.):

1. Federal Specifications for Fishery Products: This project has been assigned to the field laboratories, with primary responsibility at Boston. Information concerning specifications is discussed under the appropriate laboratory section.

2. Review of Publication Methods: Improvements were made in the methods of issuing progress reports and research reports on technological projects. More information was disseminated to the industry. The program is being considerably expanded to keep the industry informed on progress being made on all Saltonstall-Kennedy investigations, in addition to our regular activities. Current information on all projects will appear in the section "Research in Service Laboratories" in Commercial Fisheries Review.



TECHNOLOGICAL SECTION ORGANIZATION CHART

Branch of Commercial Fisheries, U. S. Fish and Wildlife Service
U. S. Department of the Interior
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Washington, D. C.

Name	Title	Interior Building Room Number	Telephone
Charles Butler	Chief, Technological Section	3024	REpublic 7-1820
Elliott A. Pachtman	Asst. Chief, " "	3024	Ext. 4745

Field Laboratories

Activity	Location	In Charge	Telephone
North Atlantic Technological Research	61 Sumner St. East Boston, Mass.	Samuel R. Pottinger	East Boston 7-6880
Middle & South Atlantic Technological Research	P. O. Box 128 College Park, Md.	Hugo W. Nilson	Warfield 7-5800
Pacific Coast Technological Research	2725 Montlake Blvd. Seattle, Wash.	Maurice E. Stansby	East 0586
Alaska Technological Research*	622 Mission St. Ketchikan, Alaska	Clarence J. Carlson	3425

* Sponsored jointly by the U. S. Fish and Wildlife Service and the Fisheries Experimental Commission of Alaska (E. C. Phillips, Chairman; Clarence J. Carlson, Secretary.)

FISH MEAL AND OIL PROJECT

The Service's College Park laboratory reports encouraging progress on the fish oil and meal project during July, with the collection, analysis, and distribution to two contractors engaged in the chick-feeding tests of 23 samples of fish meal of known history. A number of bulk samples of oil were also obtained, including one special sample which was saturated with high purity nitrogen immediately after processing. Lots of this oil are being sent to the University of Minnesota and to the Service's Seattle Fishery Technological Laboratory, while other samples have been distributed to contractors in Florida, Connecticut, Massachusetts, and Delaware.

A pilot-scale fish-meal plant is now in operation at Reedville, Va. This equipment will enable the staff to start the important in-plant phase of the project in the very near future.

These studies are being carried out with funds provided by the Saltonstall-Kennedy Act (68 Stat. 376).



SOME FACTORS AFFECTING SAWDUST LOSSES IN CUTTING FISH STICKS

On the basis of preliminary studies, the major factors determining sawdust loss during the cutting of fish sticks with a bandsaw were found to be (1) gauge (thickness of the bandsaw blade); (2) gullet shape (space between teeth); and (3) the "set" of the blade (the slight bending of alternate teeth to the left and right perpendicular to the body of the blade). Other less important factors were number of teeth per inch and width of the blade.

During this investigation a blade was chosen so as to eliminate as much as possible all of these factors. The chosen blade was a scalloped edge (serrated) band knife. This blade minimized the effect of gullet shape, gauge, and set. The blade had the following characteristics: $\frac{1}{2}$-inch width, 2 teeth per inch, no set, and 0.020-inch gauge. The sawdust loss incurred by such a blade was less than half the sawdust loss observed by the more or less standard types of blades. This blade, however, has its disadvantages in that it does not cut as quickly as a standard blade, and tends to bend a trifle under pressure when cutting fish sticks, resulting in misshapen sticks. A study is now being made to attempt to correct these faults.

--F. J. Cocca, Chemist,
Fishery Technological Laboratory,
Branch of Commercial Fisheries,
U. S. Fish and Wildlife Service,
East Boston, Mass.



CORRECTIONS FOR AUGUST 1955 ISSUE OF
COMMERCIAL FISHERIES REVIEW

Table 1 on page 63 should be corrected as follows:

Tariff Par. 721 (e) Oysters, oyster juice, etc., the rates listed in the first two columns ("Rate of Duty") should read: "8¢ lb. 3/" under the "January 1, 1955" column and "6¢ lb. 3/" under the "Geneva 1955 Agreement" column.

Tariff Par. 923, Stat. Class (1954) 3230.640, in column 3 ("Negotiating Country") footnote "2/" besides "Benelux" should be deleted.

At the bottom of the table the following footnote should be added: 3/ Including weight of immediate container.

On page 78, the legend for the sketch should be: "Model of an otter trawler."

In Chart 3, page 68, the Legend should read:

"——1955
——1954"



Additions to the U. S. Fleet of Fishing Vessels

First documents as fishing craft were issued to 60 vessels of 5 net tons and over during June 1955, according to the U. S. Bureau of Customs. This was a decrease of 27 vessels (31 percent) as compared with the 87 fishing craft newly-documented during the corresponding month of last year.

In the Gulf section only 13 vessels were documented as compared with 38 reported for June 1954, a decrease of 66 percent. The South Atlantic section had 22 additions, the Pacific section 21, the Chesapeake Bay section 9, Alaska 8, the Great Lakes and New England sections each 3, and the Middle Atlantic section 1.

U. S. Vessels Issued First Documents as Fishing Craft, June 1955 and Comparisons

Section	June		Jan.-June		Total 1954
	1955	1954	1955	1954	
	(Number)				
New England	3	8	10	18	20
Middle Atlantic	1	2	9	10	19
Chesapeake	9	7	24	54	83
South Atlantic	2	21	30	63	116
Gulf	13	38	48	224	264
Pacific	21	10	60	63	164
Great Lakes	3	-	5	3	7
Alaska	8	-	23	16	53
Hawaii	-	-	2	1	3
Unknown	-	1	-	1	-
Total	60	87	211	453	729

Note: Vessels have been assigned to the various sections on the basis of their home port.

During the first 6 months of 1955 a total of 211 vessels were documented for the first time as fishing craft, compared with 453 for the same period of last year--a decrease of 53 percent.



American Samoa

TUNA CANNERY CAPACITY TO BE INCREASED: The tuna cannery at Pago Pago, American Samoa, operated by a United States west coast tuna packer, is to be modernized and its processing capacity increased, the May 1955 Pacific Islands Monthly reports.

Principal technical difficulty is the limited reserve fish-holding capacity of the factory--about 200 tons. This means that tuna sometimes have to be wasted if large hauls are brought in by the Japanese boats. The cannery cannot keep pace with the fishing, and all holding room is fully taxed.

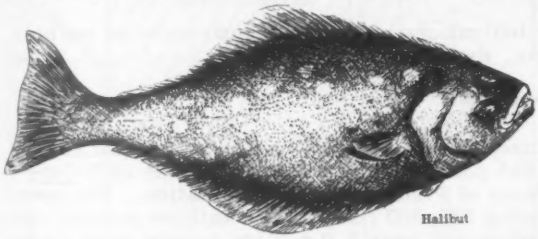
Early in April the cannery had 15,000 cases of canned fish on hand awaiting shipment.

During the peak operation the cannery employs 250 Samoans.

The Japanese fishing vessel Sassyu-Maru arrived in Pago Pago on April 21 to join the fishing fleet there supplying the American Samoa cannery with tuna for canning. The vessel left Shimizu, Japan, on March 10 and fished enough in Samoan waters to bring in 48 tons as its initial trip to the cannery.

California

"FISH OF THE MONTH" PROMOTION PROGRAM IN SOUTHERN CALIFORNIA: To increase consumption of fishery products in Southern California, the Southern California Fisheries Association has instituted a "Fish of the Month" advertising program, which will feature a variety in plentiful supply during each month of the year. The Association has joined the U. S. Department of Agriculture and the U. S. Fish & Wildlife Service in promoting the greater use of the more plentiful varieties.

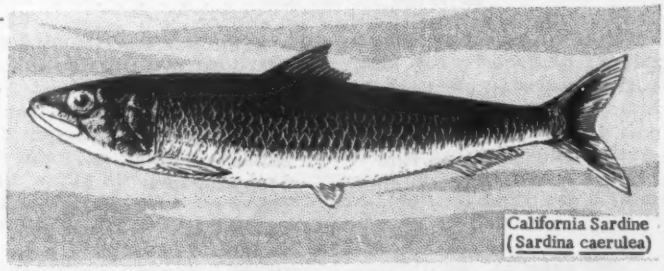

Halibut

Halibut is the first "Fish of the Month" selected for July. Also featured in releases featuring halibut as the "Fish of the Month" are rockfish fillets, true cod fillets, and sole fillets. Newspaper food editors in Southern California will be provided with information regarding the various species, and recipes for fresh and frozen fish and shellfish. Radio and TV food shows will be contacted for their support in the promotion of greater fish consumption. Trade associations and related industry representatives are also being contacted.

Whenever possible, the U. S. Fish and Wildlife Service will coordinate its activities with the Southern California Fisheries Association, lending Government promotional support to the promotion of fish where it coincides with Southern California marketing conditions.

* * * * *

SARDINE STOCKS ESTIMATED LIGHT: There are fewer adult sardines off the Pacific Coast of North America today than were caught by commercial fishermen in the 1936/37 season, the Marine Research Committee has estimated. California Department of Fish and Game officials attending the Committee's recent meeting reported that an estimate was made of about 600,000 tons of adult fish offshore July 22, as compared to a catch of 791,000 tons during the 1936/37 season.


California Sardine (Sardina caerulea)

The Committee also reported that the 1954 year-class appears to have been the poorest one in six years, considering the coast as a whole. Taking the area north of Ensenada, Baja California, the class was just fair.

Forecasting the 1955/56 season, which began August 1 in the northern area, the Committee estimated that about 300,000 tons of adult fish will be available for the commercial catch, of which about 150,000 tons could be caught. This figure is about the same as last season, although strikes and market conditions held the 1954/55 catch to about 67,000 tons.

It was unanimously agreed by the Committee that the sardines off Southern California last season were fish which had formerly spawned in Mexican waters. A larger percentage of the total spawn was off southern California in 1954 than during the previous year.

Although reasons for the northern movement are only speculation, it was reported that water temperatures were warmer and salinity less in 1954 than for the previous five years.

No concentrations of sardines or indications of eggs or spawn have as yet been found north of Pt. Conception this year, the Committee reported.

* * * * *

SALMON CATCH, 1954: The salmon catch of California's commercial fishery totaled a record 892,000 fish in the 1954 season, according to the June 1955 Outdoor California, a California Department of Fish and Game publication. The ocean troll fishery set an all-time high, landing 835,000 fish, or 8.5 million pounds, compared to the previous record in 1947 when just over 8.0 million pounds were taken. About 57,000 king salmon were taken by the river gill-net fishery in the Sacramento-San Jaoquin Delta.

* * * * *

ALBACORE TUNA SCARCE IN EASTERN NORTH PACIFIC IN MAY REPORTS "N. B. SCOFIELD" (Cruise 55-S-3): Only three albacore tuna were caught in the eastern north Pacific by the California Department of Fish and Game's research vessel N. B. Scofield on a one-month cruise completed June 4. The results of the cruise are shown in the insert.

Total baskets fished	640
Total hooks fished	6,967
Average fishing depth--middle hook:	
5-fathom float line	57 fath.
15-fathom float line	70 fath.
Total trolling time on station	70 hours 40 min.
Total trolling time between stations . . .	50 hours 20 min.

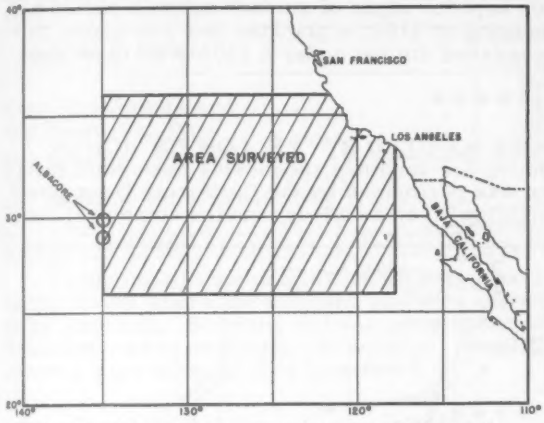
Catch:

Gear	Species	No. of Fish
Troll	Dolphin (2 lures lost)	1
Long line	Albacore tuna	3
	Skipjack tuna	3
	Big-eyed tuna	20
	Lancetfish	26
	Dolphin	14
	Opah	4
	Mackerel scad	1
	Blue shark	47
	Bonito shark	10

The 2 albacore tuna were taken on long lines along longitude 135° W. at 2 adjoining stations. The surface water temperature in this area ranged from 18.0° C.

to 18.7° C. (64.4° F.-65.7° F.). Bathythermograph casts indicate that these temperatures extended down to depths of 90 and 130 meters. The same water temperature conditions were found to the south, while north and east of the area temperatures were colder by one to several degrees.

The capture of three albacore tuna in a relatively small area of the ocean is, in itself, not very indicative. However, coupled with the fact that albacore first appear (late June) off the North American mainland at the above latitudes may suggest that their migration route is along these same latitudes, at least during the late spring and early summer months. It appears that the albacore were at some depth because they were caught by gear fishing well below the surface and none were caught or seen at surface.



Long-line fishing for albacore, M/V N. B. Scofield (55-S-3).

No surface schools of fish or bird flocks were seen during the cruise. A few storm petrels and shearwaters were seen occasionally. In general their numbers were far less than during previous cruises. Blackfooted albatross were seen almost daily. The greatest concentration occurring in the vicinity of Erben Bank, when the weather and sea were the roughest. Throughout the day in this area groups of 8 to 10 birds followed the vessel, while other groups were visible as far as the eye could see. A few bosun birds were seen in the early morning on some of the more distant offshore stations.

Porpoise and seals were seen on three occasions. Twice relatively close to shore and once on the station most distant from land.

Bathythermograph casts were made at each end of a long-line set while on a night-light station and approximately every three hours while under way. Due to very high seas, water entered the BT winch housing, making it inoperative for almost a week. In addition to the routine meteorological observations at each BT cast, surface water samples were taken for salinity determinations ashore. Sea surface temperatures ranged from 14.1° C. to 19.3° C. (57.4° F to 66.7° F.).

At each fishing station 3 depths were fished. The surface was sampled by trolling artificial lures of various types. Two subsurface depths were fished by rigging 20 baskets of long line with 5-fathom float lines and 20 baskets with 15-fathom float lines. Fresh frozen sardines--3 and 4 to the pound--were used as bait. Chemical sounding tubes were used to determine the fishing depth of each section of long line. To test the accuracy of the tubes, a special cast was made wherein the tubes were fastened to the hydrographic cable and lowered to known depths. The results indicate that the tubes are accurate to 2 fathoms. At the usual fishing depths this is an accuracy of 3.5 percent and 2.8 percent.

Unfavorable weather conditions severely hampered operations, causing two major changes in the original cruise plan and limiting the number of fishing stations to 16 and night-light stations to 11.

Two additional stations were occupied, (1) a daylight plankton tow, and (2) a hook-and-line night-light station while at anchor southeast end of Guadalupe Island, Mexico.

The following is a typical day's operation when running station lines: Forty baskets of long-line fishing gear was set at daybreak, approximate setting time 1½ hours. While this gear was soaking 6 lines were trolled in the immediate vicinity--average trolling time 5 hours. A standard 200-meter oblique plankton tow, near the center buoy, was also made while the gear soaked. Retrieving of the long-line started at 1230 and on completion--usually 2½-3 hours--the course was set for the next station 120 miles away. While en route to the next station, during daylight hours 6 lines were trolled and a watch kept for signs of surface schools of fish and bird flocks. At night, usually commencing at 2100, a plankton tow was made, followed by 1 hour of fishing with a fine meshed dip net under a 1500-watt night light.

* * * * *

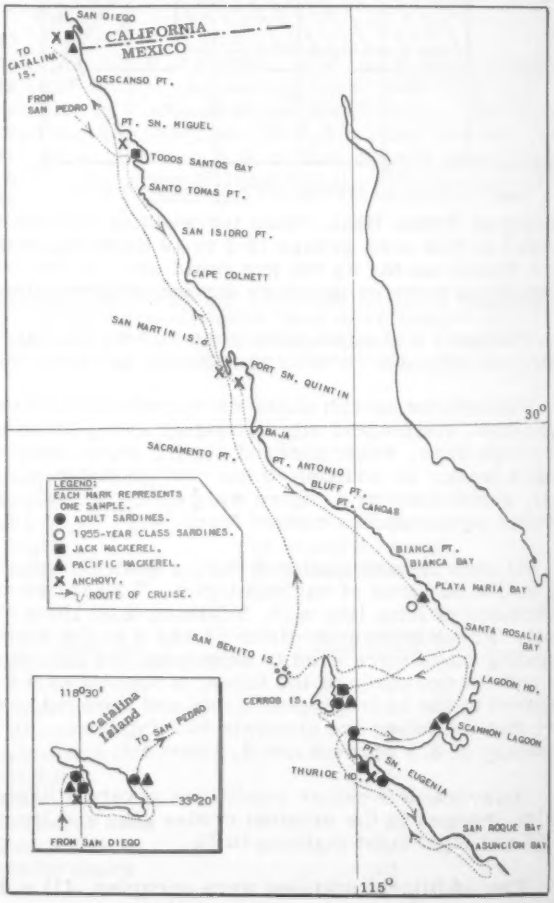
SARDINE AND ANCHOVY SCHOOLS SCOUTED BY "YELLOWFIN" (Cruise 55-Y-4): A total of 408 miles of scouting for sardines, anchovies, and mackerel in California and Baja California waters was performed by the California Department of Fish and Game's research vessel Yellowfin on an 18-day cruise completed June 8. The cruise was designed to: (1) assess the relative abundance and distribution of sardines, anchovies, and mackerel in California and Baja California waters; (2) tag and release yellowtail wherever available; (3) obtain young sardines in the Sebastian Viscaino Bay area for growth analysis study; (4) scout the area north of San Quintin Bay in conjunction with the survey flight of the Department's Beechcraft airplane.

A total of 169 fish schools were observed either visually or with the aid of the "Sea Scanar." Of the schools sighted, 87 were identified as anchovy, 34 sardine, 23 Pacific mackerel, 20 squid, and 5 saury (see table).

A total of 54 light stations were occupied and hauls with the blanket net yielded 8 samples of sardines, 6 Pacific mackerel, 5 jack mackerel, and 6 northern anchovies.

Forty-two yellowtail were caught by hook and line, tagged, and released at the San Benito Islands.

In Baja California sardines were sampled from Playa Maria Bay to Turtle Bay, at Cedros Island, and at the San Benito Islands. At the latter location a large series of postlarval and juvenile sardines (32-78 mm.) were at-



M/V Yellowfin Cruise 55-Y-4, June 21-July 8, 1955.

tracted to the night light and captured with both a dip net and the blanket net. Anchovies and jack mackerel were sampled from San Diego south to Turtle Bay and Pacific mackerel from San Diego to Scammon's Lagoon.

The scouting work conducted in conjunction with the airplane corroborated our observations that the heaviest concentration of fish in the Baja California region scouted was between Cape Colnett and San Quintin Bay. Blanket net sampling proved these fish to be both juvenile and adult northern anchovies.

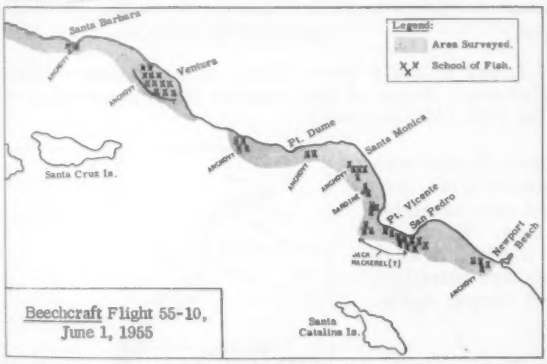
Area Scouted	Scouting (Miles)	Schools Observed	Identification 1/
	No.	No.	
Santa Catalina Island	21	17	2PM, 15SA
San Diego-Pt. Baja	136	83	71A, 12SQ
Pt. Baja-Pt. Eugenia	151	61	16A, 21PM 19SA, 5SQ
Pt. Eugenia-San Hipolito Bay	100	8	3SQ, 5SY
Total	408	169	-

1/ PM = Pacific mackerel, SA = sardines, A = Northern anchovies, SQ = squid, and SY = sauries.

Though not in the original itinerary, one night's work was devoted to Santa Catalina Island where the airplane spotters reported numerous schools of fish thought to be sardines. Scouting and sampling in the area indicated that the fish were predominantly adult sardines. In addition, Pacific mackerel, jack mackerel, and anchovies were taken at this location.

* * * * *

SARDINE AND ANCHOVY SCHOOLS SURVEYED BY AIR (Airplane Spotting Flight 55-10): An aerial survey of the area from Pt. Conception to Cape San Quintin, Baja California, including the offshore islands was made by a California Department of Fish and Game plane for approximately five hours daily from June 1-5. The purpose was to determine the distribution and approximate abundance of schooling pelagic fishes, with emphasis on the Pacific sardine and northern anchovy.



Most of the schools were difficult to identify exactly as to species from the air and it was necessary to check the schools sighted by means of sampling of catches made by commercial and bait fishermen and by directing the research vessel Yellowfin to areas of fish concentration beyond the range of the commercial fleet. Sampling of many of these schools revealed the reason for poor identification--many of the schools were composed of more than one species. Visibility from the air was good during the first three days south of Pt. Conception but only small local areas could be scouted on June 4 and 5 due to fog over the entire coast. The following is a summary of the results of the survey by species.

Anchovy: Four large school groups of anchovies were found in the area surveyed. The school group off Ventura consisted of mixed one-year-old and older anchovies and were fairly well scattered out in individual schools from $\frac{1}{2}$ to $2\frac{1}{2}$ miles offshore. About 40-50 schools were sighted in this area with a few more or less single schools scattered out below the main group off Pt. Mugu and in Santa Monica Bay.

The school group between San Pedro and Newport Beach consisted of about 100-150 schools of larger adult anchovies that were being fished by the commercial



Beechcraft Flight 55-10, June 2, 1955.



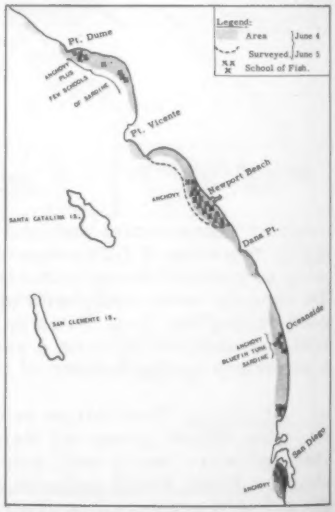
Beechcraft Flight 55-10, June 3, 1955.

fleet during the time of this flight. These schools were fairly close to shore from the breaker line to about 2 miles offshore. Some of the schools in this school group were estimated to contain upwards of 100-150 tons each.

The school group off the Coronado Strand was actually a continuous mass of anchovies from the breaker line to about $\frac{1}{2}$ mile offshore and extended along the beach for about $2\frac{1}{2}$ to 3 miles. From interviews of the bait fishermen working in this area it was disclosed that these anchovies are mostly very small fish with a few schools of larger ones mixed in.

The school group found near San Ramon Bay between Cape Colnett and Cape San Quintin was comparable in size and in relation to area near the beach as the fish found off the Coronado Strand. Sampling on the Yellowfin revealed that the fish inshore in the greatest concentrations were small fish, whereas the fish more offshore in individual schools were larger adult fish. Schools were found as far offshore as $2\frac{1}{2}$ miles in this area but the main mass was within $\frac{1}{2}$ mile of the beach.

Sardine: One school group of adult sardines was found on the west side of Santa Catalina Island. These schools were difficult to identify as



Beechcraft Flight 55-10, June 4 and 5, 1955

to species, and the Yellowfin was called on to sample these schools to make certain of identification. It was found by the biologists aboard that these large schools (upwards of 200 tons per school) were predominately sardine with a few jack mackerel mixed in. About 25 schools were observed from the plane in this area.

In general the 1954 year-class sardines were fewer in number during this period along the coast than during February and March when commercial aerial spotters located concentrations locally near Ventura and in Santa Monica Bay. Several small schools of these yearling sardines were spotted near and in the areas of anchovy concentration in the Santa Monica and Seal Beach areas. Interviews with bait fishermen disclosed that there are a few small schools of small sardines present in these areas but not as many as a few months ago.

Mackerel: The large school group of fish presumed to be jack and Pacific mackerel was present on June 1 from Pt. Vicente to San Pedro. This school group was not found on the preceding days of scouting, which is typical of the behavior of jack mackerel, which are known to "run" for a few days in an area then disappear.

Other Species: Four schools of white sea bass were spotted near San Jose Point, Baja California, and observations were made of purse-seine boats working in cooperation with aerial spotters while catching bluefin tuna between Pt. Loma and Newport Beach.

* * * * *

AERIAL SCOUTING OF SARDINE AND ANCHOVY SCHOOLS CONTINUED (Airplane Spotting Flight 55-11): Aerial flights over the inshore area from Pigeon Pt. in central California to Newport Beach in southern California were resumed July 18-23 by the California Department of Fish and Game. The flights were made to determine the northward movement of the Pacific sardine and the distribution and abundance of the northern anchovy.

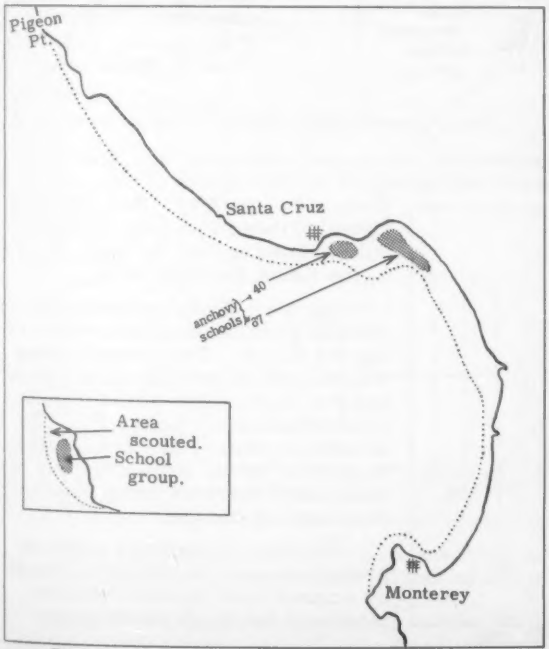


Fig. 1 - Airplane (Cessna) flight 55-11 (July 18-19, 1955).

Efficient coverage of the entire coastline was hampered by local fog conditions and on each day it was not possible to cover the entire area desired. By the end of the five-day period all the area except to the north of Pigeon Pt., a small area around Pt. Sal, a small area around Pt. Mugu, and the area to the south of Newport was covered.

The inshore waters were of brown and green types (predominately phytoplankton) from Pigeon Pt. south to about Santa Barbara. South of Santa Barbara patches of "milky" and "blue" water were interspersed with the phytoplankton waters. These milky and blue waters are predominately of zooplankton.

Identification of schools observed were determined by the observer and were later checked by interviewing commercial spotters and

fishermen fishing in the areas covered during the same period. The research vessel Yellowfin was also working in the area, and sampling at night aided identification of school groups. The following is a summary of the results of the survey by species.

Anchovy: Three school groups of anchovies were observed in the area surveyed. The school group in Monterey Bay was concentrated in the northern end of the bay between Santa Cruz and Sunset Beach State Park. Approximately 110 schools were observed close to the beach and kelp beds. These schools were very thin in depth and most probably not more than about 10-20 tons of fish per school on an average.

The school group of anchovies between Santa Barbara and Carpenteria consisted of at least 119 anchovy schools each ranging from 20-50 tons each. This school group extended for about 4 miles in length and was about $\frac{1}{4}$-mile wide forming a band of fish parallel to the shore about 2 miles from the beach. Commercial fishermen reported these fish to be mixed adult and young anchovies.

The school group observed on July 22 in Santa Monica Bay did not appear to be of much magnitude when the area was covered in mid-morning when 40-45 schools were observed. A second flight over the area in the afternoon of the same day revealed many more schools than seen previously. Approximately 210 schools were scattered out in four areas of concentration throughout the Bay. Bait sampling revealed these fish to be mixed adult and young fish as were found in the Santa Barbara area.

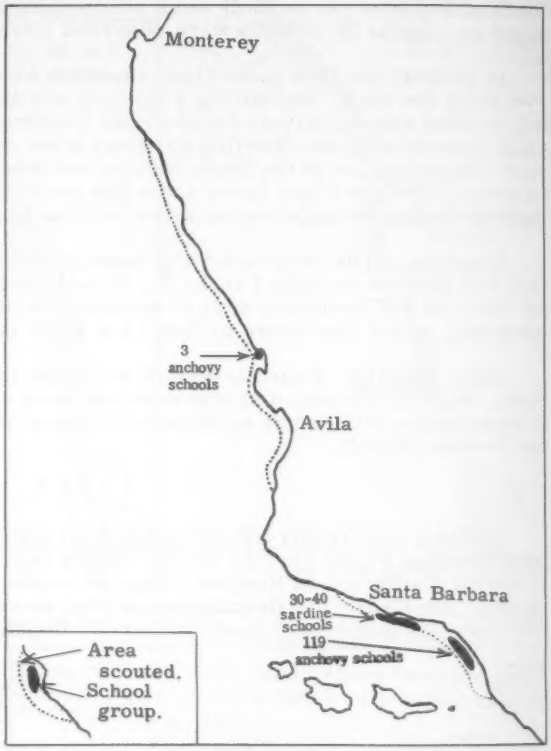


Fig. 2 - Airplane (Cessna) flight 55-11 (July 21, 1955).

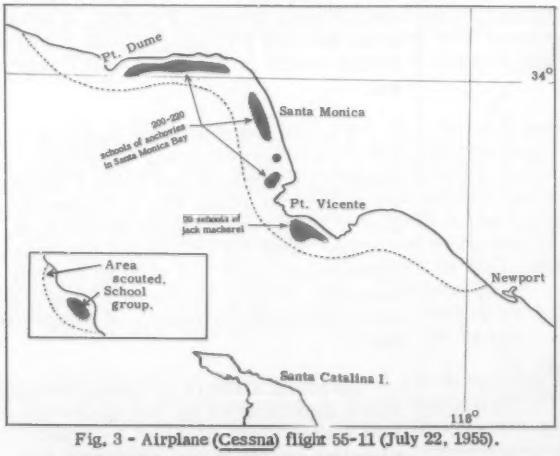


Fig. 3 - Airplane (Cessna) flight 55-11 (July 22, 1955).

Sardine: Only one school group of adult sardines was observed during the flight. This school group was located between Santa Barbara and Pt. Conception with the main concentration off Goleta Pt. The schools in this area were small 5- to 10-ton "spots" predominately of adult sardines with some Pacific mackerel mixed in.

Schools of sardines were reported around the offshore islands by commercial spotters but the plane did not work these areas.

Jack Mackerel: One school group of jack mackerel was observed off Pt. Vicente on July 22. This school group had apparently recently moved into the area and was

quickly located by the commercial fleet. Fifteen purse-seine boats and three aerial spotters were working these fish.

No flight was made on July 20, and no fish were spotted in the area from Pt. Sal to San Simeon on July 23.



Canned Tuna Consumption in Federal Penal and Correctional Institutions, 1954

Canned tuna consumption in 27 Federal penal and correctional institutions is depicted in table 1 and figures 1 and 2. These institutions had in 1954 an average

Table 1 - Canned Tuna Consumption in 27 Federal Penal and Correctional Institutions, 1954

Area and State	Non-Users		Users					
	No. of Inst.	Avg. Pop. of Inst.	No. of Inst.	Avg. Pop. of Inst.	Annual Consumption	Per Capita Consumption	Can Size	Unit Cost Per Pound
					Pounds	Pounds		¢
NORTHEAST	1/	500	2	1,500	1/	1/	-	-
Connecticut	1	500	-	-	-	-	-	-
New York	-	-	1	200	250	1.25	1 lb.	52
Pennsylvania	-	-	1	1,300	Not Reported		Not Reported	
NORTH CENTRAL	2	3,325	3	3,675	4,444	1.21	-	-
Ohio	-	-	1	1,250	2,400	1.92	1 lb.	65
Michigan	1	650	-	-	-	-	-	-
Indiana	-	-	1	1,325	884	0.67	1 lb.	56
Missouri	-	-	1	1,100	1,160	1.05	4 lbs.	57
Kansas	1	2,675	-	-	-	-	-	-
SOUTH	7	3,505	6	5,475	3,625	0.66	-	-
Washington, D. C.	-	-	1	460	231	0.50	-	-
West Virginia	1	250	1	640	714	1.12	7 oz.	64
Virginia	1	75	1	800	360	0.45	Not Reported	
Georgia	-	-	1	2,600	432	0.17	Not Reported	
Florida	1	600	-	-	-	-	-	-
Kentucky	1	-	-	525	1,600	3.05	1 lb.	56
Alabama	1	240	-	-	-	-	-	-
Oklahoma	1	1,100	-	-	-	-	-	-
Texas	2	1,240	1	450	288	0.64	Not Reported	
WEST	1	300	5	2,895	1/	1/	-	-
Colorado	-	-	1	400	Not Reported		7 oz.	64
Arizona	1	300	1	275	Not Reported		Not Reported	
Washington	-	-	1	1,400	700	0.50	13 oz.	74
California	-	-	2	820	1,148	1.40	13 oz.	36
Total	11	7,630	16	13,545	1/	1/	-	-

1/ Data not available.

combined population of 21,175 persons; they are located throughout the United States with the greatest concentration (13 out of 27) in the South.

In 1954 a comparatively large number (11) of all 27 institutions surveyed did not use canned tuna, according to data furnished by the Federal Bureau of Prisons.

Institutions in north central United States used more pounds of canned tuna and have a higher per capita consumption than did institutions in the South.

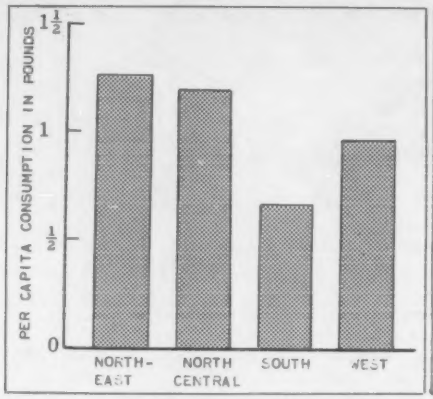


Fig. 1 - Per capita consumption of canned tuna in 12 Federal penal and correctional institutions, 1954.

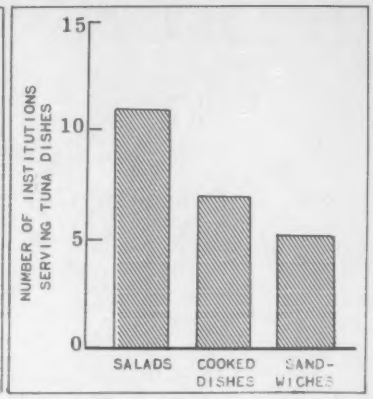


Fig. 2 - Types of tuna dishes served in 12 Federal penal and correctional institutions, 1954.

The average annual per capita consumption of canned tuna for the 12 institutions reporting tuna consumption was 1.06 pounds.

Eleven out of twelve institutions purchased canned tuna in cans of one pound or less.



Cans--Shipments for Fishery Products, January-May 1955



Total shipments of metal cans for fish and sea food during January-May 1955 amounted to 34,027 short tons of steel (based on the amount of steel consumed in the manufacture of cans), compared to 29,842 short tons in the same period a year earlier.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 22.0 base boxes of steel equal one short ton of steel.



Federal Purchases of Fishery Products

FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY DEPARTMENT OF DEFENSE, JUNE 1955: For the military feeding of the U. S. Army, Navy, Marine Corps, and Air Force, the Army Quartermaster Corps in June 1955 purchased fresh and frozen fishery products amounting to 2.3 million pounds, valued at $1.0 million (see table). This was an increase of 7.0 percent in quantity and 7.2 percent in value as compared with May purchases, but lower by 22.8 percent and 17.1 percent, respectively, than June 1954 purchases.

Purchases of Fresh and Frozen Fishery Products by Department of Defense (June and the First Six Months of 1955 and 1954)

QUANTITY				VALUE			
June		Jan.-June		June		Jan.-June	
1955	1954	1955	1954	1955	1954	1955	1954
(Millions of Pounds).				(Millions of Dollars).			
2.3	3.0	13.1	12.0	1.0	1.2	5.6	5.1

Purchases of fresh and frozen fish and shellfish by the Army Quartermaster Corps during the first six months in 1955 totaled 13.1 million pounds (valued at $5.6 million) as compared with purchases of 12.0 million pounds (valued at $5.1 million) for the similar period a year earlier.

The Department of the Army in June 1955 paid an average price of 43.2 cents per pound for fresh and frozen fishery products purchased as compared with 43.1 cents in May and 40.2 cents in June 1954.

In addition to the purchases of fresh and frozen fishery products indicated above, the Armed Forces generally make local purchases which are not included in the above figures. Therefore, actual purchases are somewhat higher than indicated, but it is not possible to obtain data on the local purchases made by military establishments throughout the country.



Florida

FISHERY LANDINGS AND MARKETING, 1954: General Trends: The 1954 total landings of Florida's commercial fisheries amounted to over 170 million pounds, valued at $24.5 million--a decrease of about 36 million pounds and $7 million in value as compared with 1953 (table 1). Decreases occurred principally in the menhaden and shrimp catches. Menhaden landings decreased approximately 28 million pounds and shrimp catches were down about 8 million pounds.

Table 1 - Landings of Fishery Products at Florida Ports, 1953-54

Species	1954	1953
	(Million Lbs.)	
Fish:		
Bluefish	1.9	2.1
Catfish, fresh-water	2.1	2.1
Groupers	5.4	4.8
King mackerel	2.0	2.5
King whiting	1.0	-
Menhaden	41.9	69.5
Mullet, black	27.8	27.3
" silver	1.1	1.4
Sea trout, spotted	3.4	3.7
Snapper, red	6.1	5.5
Spanish mackerel	4.9	6.5
Miscellaneous	9.4	10.5
Total Fish	107.0	135.9
Shellfish, etc.:		
Crabs, hard, blue	9.8	9.6
Lobsters, spiny	1.9	2.0
Shrimp	50.9	58.5
Miscellaneous	1.1	.9
Total Shellfish	63.7	71.0
Grand Total	170.1	206.9

Shrimp: Of the 50.8 million pounds (heads-on) of shrimp landed in Florida during 1954, 5.1 million pounds were caught on the east coast, 18.3 million pounds on the Tortugas Grounds, 24.9 million pounds on the Campeche Banks, and 2.6 million pounds on the upper west coast of Florida. Compared with 1953, production was about the same on three grounds, while the Campeche catch accounted for most of the 8 million-pound decline. Despite this sizable decrease, the shrimp fishery is still Florida's first ranking fishery in value, and in 1954 exceeded menhaden in volume.

Shrimp fishing operations have not changed substantially from 1953 to 1954. The vessels still migrate to areas of high production. This migration occurs from the Carolinas in midsummer and moves down to Georgia and the Florida east coast in the fall where production is at its peak in October and November. Most of these boats then move to Key West and Fort Myers, where they fish the Dry Tortugas banks. There are about 300 vessels in this migration. There are many "resident" shrimp vessels that operate principally on Campeche and to a lesser degree in the fisheries near Dry Tortugas and Sanibel Island.

Generally the price structure for shrimp in 1954 remained fairly stable as compared to previous years. The 21-25 count heads-off pink shrimp ranged from about

50 to 68 cents a pound ex-vessel. There were very few price wars among Florida shrimp dealers this year. This harmonious condition helped to maintain a stable market.

Production of shrimp varied seasonally in each area. During May and June production was at its lowest in all areas. Then and during the following few months boat owners had difficulty making their monthly boat payments. One loan company in Miami refinanced 22 of 40 shrimp boats for which loans were outstanding. Conditions improved considerably as production increased in the fall and winter.

Table 2 - Ex-vessel Prices for Florida's Ten Leading Species, 1953-54

Species	1954	1953
	¢/lb.	¢/lb.
Black, mullet	8	9
Blue crabs	5	4
Groupers	11	10
King mackerel	13	17
Menhaden	1.1	1
Red snapper	27	27
Shrimp, heads-off	28	36
Spanish mackerel	12	11
Spiny lobsters	22	20
Spotted sea trout	24	24

Finfish: Production of food finfish in 1954 was approximately the same as in 1953. The principal decrease (28 million pounds) was in the menhaden catch. The menhaden plant in Apalachicola did not operate because of the absence of fish.

The industry claimed that because of poor marketing conditions maximum production was not obtained. This appeared to be true in most areas and for most species. Many industry members pointed out that the marketing difficulties encountered for Florida fishery products were due to the (1) heavy influx of northern fillets on southern markets; (2) competitive prices of beef, pork, and poultry; and (3) outmoded fresh-fish marketing methods.

Except for shrimp, ex-vessel prices for Florida's 10 leading species did not change substantially in 1954 as indicated in table 2.

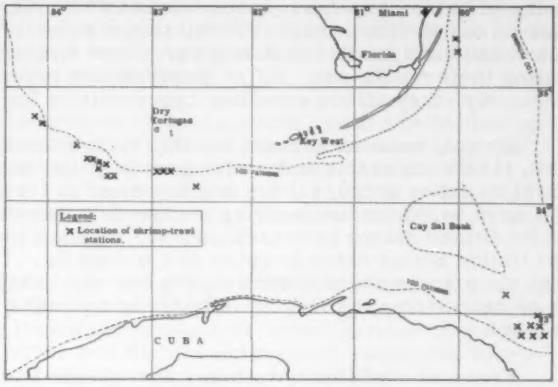
--Billy F. Greer, Fishery Marketing Specialist,
Branch of Commercial Fisheries,
U. S. Fish and Wildlife Service,
Coral Gables, Fla.

Gulf Exploratory Fishery Program

RED SHRIMP EXPLORATIONS CONTINUED BY "OREGON" (Cruise 32): Deepwater trawling explorations for red shrimp in the Florida Straits-Bahama Channel area were conducted by the Service's exploratory fishing vessel Oregon on a 23-day cruise. The vessel returned to Pascagoula on July 28, 1955.

A series of 16 shrimp-trawl drags were made along the 200-fathom curve south of the Dry Tortugas. It was in this area that the Oregon discovered promising concentrations of red shrimp in April 1954. The best catches made during this cruise ran from 190 to 210 pounds per 3- to 4-hour drag using a 74-foot balloon trawl. In April 1954 the catches yielded approximately 180 pounds per 2-hour drag using smaller trawls. Five of the sixteen drags resulted in serious damage to the trawling gear. Two complete rigs, including a pair of 8-foot doors and a pair of 12-foot doors, were lost. Since echo tracings showed good trawling bottom, it was believed likely that the nets struck obstacles, such as sunken ships, that had not been picked up on the depth recorder.

A series of 8 shrimp-trawl drags were made southeast of Cay Sal Bank between the north coast of Cuba and the Bahama bank. Although an extensive area of good trawling bottom was found in depths of 200 to 260 fathoms, catches failed to yield any red shrimp. Bottom temperatures in this area were found to run from 60° to 65° F., which is from 10 to 15 degrees warmer than comparable depths in the Gulf of Mexico where red shrimp concentrations have been found. The only loss of gear in this area was a 16-foot beam trawl. The trawling wire parted at the winch, and the beam trawl and 700 fathoms of trawling wire were lost.



Cruise No. 32--M/V Oregon.

A series of dredge stations were made in the Straits of Florida between Sombrero Key and Miami to determine if suitable bottom conditions existed to permit exploratory drags using shrimp trawls. At one station in 240 fathoms off Key Largo two large red shrimp were caught in the dredge. Subsequently, two exploratory drags using 40-foot shrimp trawls were tried in this area. Neither of these drags was successful in reaching the bottom and due to the extreme difficulties encountered in handling the vessel in the Gulf Stream current, this work was discontinued.

The period of July 20-24 was spent along the western edge of the Bahama bank making underwater observations of shrimp trawls in action. Although good trawling bottom was located, strong winds and turbid water prevented the taking of motion pictures.

A port call was made in Havana on July 12, and an official observer of the Cuban Navy accompanied the Oregon while the vessel was working off the north coast of Cuba.

The Oregon was scheduled to depart Pascagoula on August 9 to carry out three weeks of commercial-scale long-line fishing in the northeastern and north central Gulf of Mexico. It was planned to make from 15 to 18 100-basket (1000 hooks) sets throughout this area to obtain a more accurate estimate of possible commercial production of deep-swimming yellowfin tuna in the Gulf of Mexico.

In cooperation with the marlin research program of the Woods Hole Oceanographic Institute, all marlin landed in good condition will be tagged and released on this cruise.

Hudson River Shad Catch, 1954

The total catch of shad in the Hudson River (Weehawken, N. J., to Albany, N. Y.) in 1954 amounted to 1,249,300 pounds, valued at $164,800, reports the Service's Fishery Marketing Specialist stationed in New York. The 1953 catch totaled 938,700 pounds, valued at $155,500. The 1954 average price was lower than a year earlier. In 1954 the New Jersey side of the Hudson River accounted for 664,700 pounds and the New York area catch was 584,600 pounds. In 1953 the New Jersey catch totaled 473,700 pounds and the New York catch 465,000 pounds.

Institutional Feeding Potential for Fishery Products

The phenomenal growth in institutional feeding has created an increasingly fertile field for the marketing of fishery products. It is estimated that 1 in every 4 meals today is eaten away from home; whereas 100 years ago only 1 meal in every 200 was an out-of-home meal. Today in the schools, restaurants, cafeterias, hotels, lunch counters, railroad dining cars, and airplanes more and more Americans are eating their meals out. All of these outlets purchase food in large quantities. Consequently, they afford excellent opportunities for fish and shellfish sales.

Several reasons account for this tremendous increase in the institutional market: (1) the extensive industrial growth of our nation; (2) the shift of population from rural to urban areas; (3) the improvement in transportation facilities, and (4) the increase in this nation's living standards. One-half of the large industrial plants in the United States have facilities for in-plant feeding. One meal in every eight in the United States today is eaten in the schools. There is every reason to believe that the present trend toward eating out will continue. With this fact in mind, there is no reason why the fishing industry today could not have a greater share of this market.

Fish and shellfish have many advantages that make them particularly appropriate for the institutional market. The variety, versatility, convenience, high nutritional qualities, and reasonable price range qualify them well for this market. Consumer surveys have shown that many persons prefer to eat fish or shellfish in restaurants or other institutional eating places because of the qualities listed above. This institutional outlet, as a result, represents not only a volume market, but it affords an excellent opportunity to develop a consumer desire for fishery products that will extend to the home market.



Interior Department Supports National Fish Week

Full support to the commercial fishing industry's plans for the industry-designated National Fish Week, October 3-8, and the Shrimp 'n Rice Fiesta, September 29-October 8, was pledged on September 15 by Secretary of the Interior McKay.

In addition, the Secretary said that the Fish and Wildlife Service will coordinate its fishery educational and market development activities with those of the industry during these fall consumer-education campaigns.

Fishery products, according to the Fish and Wildlife Service, will be in good supply during these October campaigns as a result of the heavy fishing activities that annually occur during the summer months. The development of so many new types of processed fishery products, such as fish sticks and breaded shrimp, will enable consumers to be more selective in their choice of fish and shellfish whether eaten at home or in restaurants.

In keeping with the Department's policy of working in partnership with industry, Secretary McKay stated that home economists and fishery marketing specialists of the Fish and Wildlife Service will conduct fish cookery demonstrations for school lunchroom supervisory personnel in Wisconsin, Florida, Texas, and Massachusetts during the next few months. These demonstrations not only acquaint school lunchroom personnel with improved methods for preparing fishery products for children but provide them with current information on the kinds of fish and shellfish that are best adapted to school lunchroom menus and budgets.

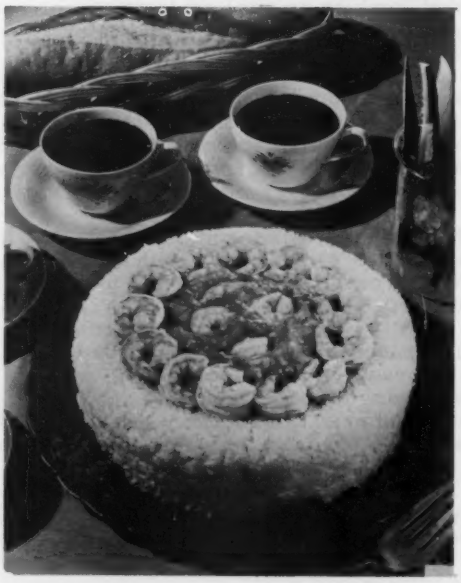
As a further aid to the industry programs, home economists at the Service's test kitchens in College Park, Md., and Seattle, Wash., will concentrate on developing new recipes suitable for large quantity as well as home users of fishery products. Results to date of such test kitchen work are now available in a series of publications sold by the Superintendent of Documents, Government Printing Office, Washington, D. C.

Other activities of benefit to the fishing industry are the new research programs being conducted by the Service under the Saltonstall-Kennedy Act, now in its second year of operation. These activities include technological investigations in the freezing and preservation of fishery products, and the development of standards which will assure the consumer of consistent quality.

Also, through Service exploration of new fishing grounds and the development of new fishing methods, fishing fleets will be enabled to operate more efficently and thus pass these economies on to the consumer. In order that the industry can provide the type of product that best meets the customers'desires, the Service is conducting consumer surveys to determine the purchasing requirements of the consumer.

Investigations of a biological nature are also under way designed to preserve the fishery resource and make it even more productive in the future.

National Fish Week, October 3-8, is the industry designated period for a coordinated national promotion campaign to create a yearly fall selling season for all types of fishery products in the United States. The slogan "Join The Fish Parade" will be a familiar slogan on individual firm letterheads and advertising, as well as being featured by many of the national and regional fishery associations. The industry plans to have advertisements in several of the national trade publications, and through its public relation facilities to use newspaper, radio, and television publicity to acquaint the consumer with the nutritional qualities of fishery products, the variety of items that are available, the ease with which they can be prepared, and the moderate prices at which they are available.



Shrimp creole is one of the many recipes tested by the Fish and Wildlife Service's home economists.

The Shrimp 'N Rice Fiesta, September 29 to October 8, is a tie-in promotion program of the Shrimp Association of the Americas with the domestic rice industry. The combined merchandising, publicity, and advertising forces of the shrimp and rice industries will be behind this program. This campaign will be tied in with National Fish Week.

The U. S. Fish and Wildlife Service is working with the fishery industry in both of these campaigns and the U. S. Department of Agriculture will assist through its food promotional outlets. Recipes, fact sheets, and other materials are being distributed to radio, television, and newspaper food editors, institutional food users, food trade groups and associations, and other commercial outlets. The Service's school-lunch fish-cookery program will also be stepped up as the fall school season reopens.

With competing protein food stocks at extremely high levels, the competition facing the fishing industry for the consumers' food dollar is intense. Through these programs the industry is taking an aggressive approach toward maintaining its position in the national diet.



Maine

SARDINE INDUSTRY RESEARCH FACILITY ESTABLISHED AT UNIVERSITY OF MAINE: An agreement between the Maine Sardine Tax Committee and the University of Maine for a cooperative sardine industry technological research program was announced August 12. The Committee's executive secretary, Richard E. Reed, said that work on several projects was already under way and that it was expected the agreement would result in the establishment of a permanent sardine research facility at the University.

A well-equipped research laboratory, partially financed by the Committee, will be set up in a portion of a new wing which is now being added to Holmes Hall, location of the Maine Agricultural Experiment Station. Facilities of the Food Processing Department are being utilized while an experimental quality-control operation is housed in a temporary wooden building.

The industry's research director, Dr. Berton S. Clark, with several assistants, is handling the sardine work with specific projects assigned on a contract basis to the Food Processing Department, under the supervision of Dr. Matthew E. Highlands.

The purpose of the program was to provide the industry with an aggressive program of research and development for fish handling, processing, quality control, and packaging to help it compete successfully in the nation's fast changing and expanding food market. Industry and University officials were in full accord on all phases of the program and that this was resulting in very close cooperation.

"Sardine fishing and packing is a big business in Maine and our Committee is very gratified to have President Hauck and his associates at the University take such a practical interest in the problems and development of our industry" the Committee's Executive Secretary stated.

Director Clark's top assistants are Ralph Berglund, a former West Coast salmon canning expert and Otis Anthony of Hampden.

The research will continue on a year-round basis.

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MAINE SARDINE COUNCIL: As a result of law changes by the last Maine Legislature, the Maine Sardine Tax Committee became the Maine Sardine Council on August 21, 1955. With the change of name also comes added responsibility for the group in administering the sardine tax of several hundred thousand dollars a year, the Maine Sardine Industry announced recently.

Previously the program was under the joint direction of the Committee and the Maine Development Commission. In the future the Council will have full direction with the new Department of Industry and Commerce (successor to the Development Commission) assisting only in an advisory capacity. Another provision changed the quorum requirement for the 7-man Council meetings from 5 to 4 members. Present members of the Tax Committee will serve the remainder of their original terms under the new setup.

Tax funds go to finance an industry development program which includes advertising, merchandising, technological and consumer research, as well as other activities.

* * * * *

MAINE SARDINE ADVISORY BOARD APPOINTED BY MAINE AGRICULTURE COMMISSIONER: A seven-man committee to confer with his office in an advisory capacity on matters pertaining to the sardine industry was appointed by Maine's Agriculture Commissioner on August 20.

Named to the group, which was created by the last Maine Legislature, were active packers, Moses Pike and Lester Wass of Eastport, Milroy Warren of Lubec, John Tarbox of Gouldsboro, George Seybolt of Watertown, Mass., Samuel Zwecker of Port Clyde, and Calvin Stinson, Jr. of Birch Harbor.

Maine's Agriculture Commissioner is responsible for the administration and enforcement of all laws pertaining to the inspection of sardine plants and processing operations. This activity is financed by a 3-cent-a-case tax paid by the packers.

Sweeping changes in the laws, made last winter, became effective on August 20. They greatly increase the Agriculture Commissioner's authority to promulgate and enforce regulations designed to improve quality and the packing processes.

A provision also makes it mandatory that all cans containing four fish be identified accordingly by prominent lettering on the covers.

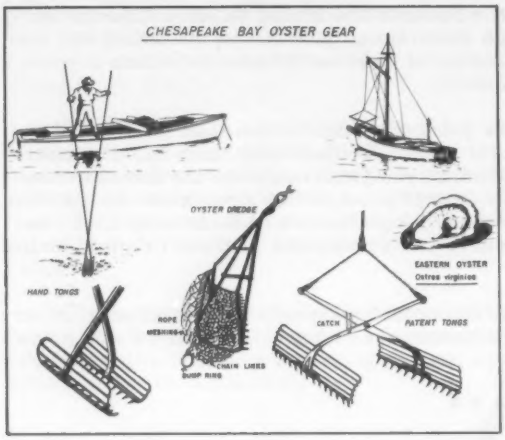
The Agriculture Commissioner stated that he planned to call the Committee together shortly to review quality-control activities that have been in operation during the past few months and to discuss application of the new laws.

Maryland

1954/55 OYSTER PRODUCTION HIGHEST IN 15 YEARS: Maryland's oyster production in the season recently ended was 3.1 million bushels--the highest in 15 years, the Department of Tidewater Fisheries reported recently.

The Department is hopeful that its oyster propagation program will continue to expand the industry to 5 million bushels or more a year.

The catch for this year was more than half a million bushels over last year's, which was a relatively poor season after the 1952/53 production of 2.6 million bushels.



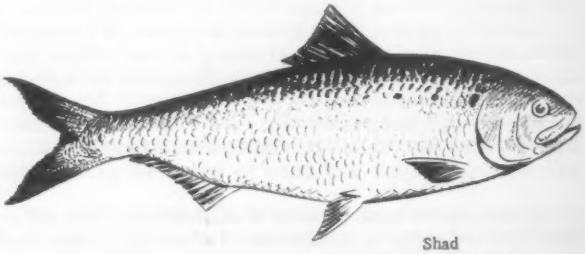
The Department has been increasing its shell-planting program each year, having planted 2.1 million bushels in 1954. This year the goal is 2.25 million.

Planting began in the middle of April and already well over 1 million bushels have been put overboard in strategic locations. Shelling crews were hustling to plant the rest of the quota by July 25--the date set by scientists as the optimum time for oyster spat to catch on the shells.

The Tidewater Fisheries Department will take up many of its seed oysters in the fall and replant them, but the shell planting is considered of greatest importance because it is less expensive and requires only one operation.

Massachusetts

NEW CONNECTICUT RIVER SHAD FISHWAY: Sea-run Atlantic shad have been unable to reach their ancestral spawning grounds in the middle Connecticut River for 107 years due to the presence of a large power dam at Holyoke, Mass. Various "Rube Goldberg" devices have been tried in past years to surmount this obstacle. The Holyoke Water Power Company has been especially active and is to be commended for its persistent efforts to help solve this important fishery problem in the face of more or less constant abuse.



Shad
(Alosa sapidissima)

The success that has been achieved at last is the more significant since the fish passage device at Holyoke--a fish trap and elevator system--is the only fishway which has accommodated large numbers of shad on the Atlantic Coast. The venture, undertaken in cooperation with the U. S. Fish and Wildlife Service, is considered highly successful. The Service reports that 4,902 shad were passed over Holyoke Dam in a little over a month during the past spawning run.

North Atlantic Fisheries Exploration and Gear Research

FIRST BLUEFIN TUNA CAUGHT IN NORTH ATLANTIC WITH POLE-FISHING GEAR: Approximately 2,500 pounds of bluefin tuna were caught August 16 about 20 miles south of Martha's Vineyard, Mass., by the chartered commercial vessel Stormy Weather II. Records indicate that this is the first tuna catch made in the North Atlantic using live-bait and pole-fishing methods.

The Stormy Weather II, chartered by the Service's Exploratory Fishing and Gear Development Section, departed East Boston on August 5 for fishing operations in offshore New England waters through September 30.

The fish caught averaged from 20 to 25 pounds each, and were taken on tuna poling gear, rigged with feathered barbless hooks. Live butterfish carried aboard in a specially-constructed tank were used to chum the fish alongside the vessel and within range of the fishing poles.

Two tuna schools were sighted in the vicinity. One school was estimated to contain 75 tons of fish, the other 2 to 3 tons. The catch was made from the larger school. The Stormy Weather II planned to continue fishing in the same general area for about 3 or 4 more days.

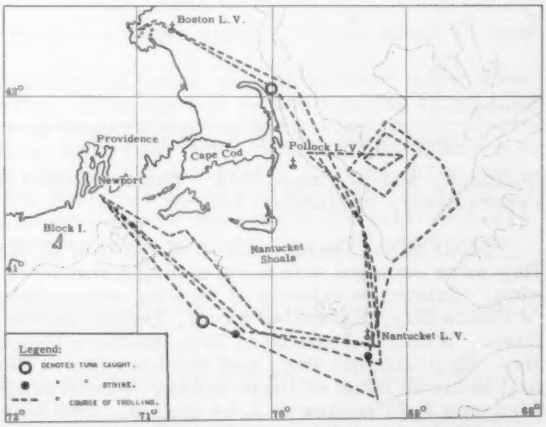
Objective of these operations by the Stormy Weather II is to determine if bluefin tuna (Thunnus thynnus) can be taken in commercial quantity by the live-bait fishing method in New England waters. This method is well developed on the Pacific Coast, and most of the tuna processed by the large industry there are captured by it.

The Stormy Weather II is 83 feet in length, and has been equipped with a live-bait tank, tuna racks, and other equipment necessary for pole fishing. The vessel and its crew are operating under a charter, and a Fish and Wildlife Service representative is aboard the vessel observing its operations.

It is planned to procure live bait from fish traps located along the shore as near as possible to areas where schools of bluefin tuna are located.

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LIVE-BAIT POLE FISHING FOR TUNA BY "DELAWARE" HAMPERED BY ROUGH SEAS (Cruise 8): On a 10-day cruise in the Gulf of Maine and southern New England waters unsuccessful attempts were made by the Service's exploratory fishing vessel Delaware to bring bluefin tuna within range of pole-fishing gear by live-bait chumming. The trip was completed at East Boston August 10. These attempts were made in the area where two tuna (totaling 35 pounds) were captured on jigs. During the cruise there were no indications of surface tuna schools although the rough seas that prevailed during most of the trip made observations of this type extremely difficult.



Cruise 8 of the Service's exploratory fishing vessel Delaware, August 1-10, 1955.

The Delaware was forced to return to port earlier than planned due to hurricane warnings. This cruise was designed to determine the availability of bluefin tuna and to test live-bait and pole-fishing methods in the tuna fishery.

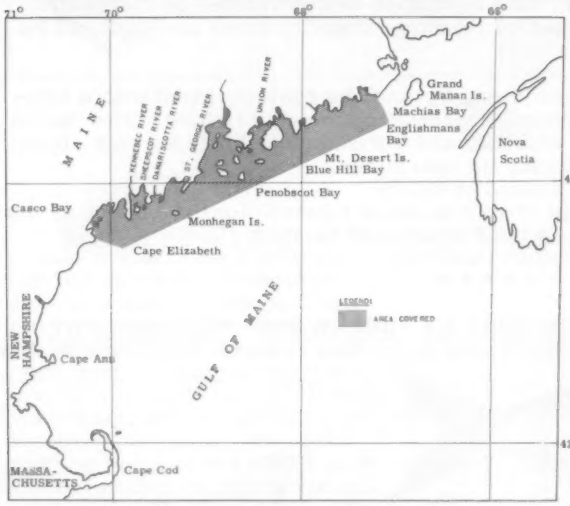
Live bait, consisting of butterfish and alewives, was obtained from Rhode Island fish traps on August 3 and 9. The bait was brailed directly from the traps into a live-bait tank aboard the Delaware where a continuous circulatory sea-water

pumping system was employed to assist in keeping the fish alive. Bait survival was poor with very few fish remaining alive after three days in the tank.

After procuring bait the vessel proceeded offshore and scouted the South Channel and Nantucket Shoals area for signs of surface tuna schools. While traversing the grounds, three jig lines were trolled from the stern of the vessel at speeds from 7 to 8 knots. Four strikes were noted and two tuna, weighing a total of 35 pounds, were captured on the jigs.

North Atlantic Herring Research

LARGE SCHOOLS OF HERRING OBSERVED OFF MAINE IN JUNE-JULY BY "THEODORE N. GILL" (Cruise 3): Large schools of herring were observed offshore from approximately 2 miles off Petit Manan Island to approximately 2 miles off Stelle Harbor Island, Maine, by the Service's research vessel Theodore N. Gill on a 12-day cruise completed at Boothbay Harbor on July 9. A sample of these fish taken with a seine at a point 4 miles southwest off Great Wass Island, Pleasant Bay, averaged 2.36 inches standard length.



Theodore N. Gill Cruise 3, June 27-July 9, 1955.

This was the third cruise of the Theodore N. Gill in the program of exploratory fishing and biological investigation on the Maine herring fishery. The cruise was interrupted on July 2 for the Fourth-of-July weekend.

Large solid concentrations of herring were located and sampled one mile east of Isle au Haut and in Hussey Sound, Casco Bay. These catches measured 3.04 inches and 2.31 inches, respectively, in standard length.

Most of the inside waters of the Gulf of Maine from Cape Elizabeth to Machias Bay were sounded with a recording fathometer and a scanning-type echo-ranging device. Extensive schools of herring were observed with these devices in some areas of Casco Bay, Sheepscot River, Damariscotta River, Muscongus Bay, St. George River, Western Penobscot Bay, Eastern Penobscot Bay, Blue Hill Bay, Union River Bay, Englishmans Bay, and Machias Bay. The fish were sampled with a lampara bait seine in most of these areas. The average standard length of the herring sampled was 2.22 inches to 3.04 inches. The smallest herring observed was 1.85 inches, and the largest was 3.82 inches in length. The lampara seine samples only the surface water and, therefore, is possibly rather selective as to size classes. Larger herring may be deeper in the water.

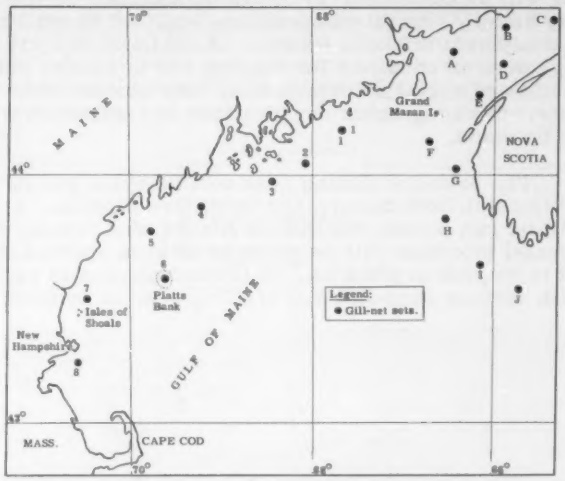
Each time herring were sounded the surface water temperature recorded on the thermograph was observed to drop several degrees below average.

Radio broadcasts on 2638 kc. were made each day of the operations to report results of the work to commercial fishermen in the area.

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HERRING REPORTED SCARCE OFF MAINE COAST IN JULY-AUGUST BY "THEODORE N. GILL" (Cruise 4) AND "HARENGUS:" A general lack of herring in the waters of the Gulf of Maine was noted by the Service's research vessel Theodore N. Gill and the Fisheries Research Board of Canada's vessel Harengus on a cooperative cruise during the last week of July and the first week of August. These cruises were designed to gain information on the life history and seasonal occurrence of the Atlantic herring (Maine sardine).

A series of gill-net sets, using nets of graduated mesh size, was made at the positions indicated in figure. Sets made by the Harengus are indicated by letters "A" through "J" and sets made by the Theodore N. Gill are indicated by the numbers "1" through "8."



Gill-net sets by the Service's research vessel Theodore N. Gill during Cruise 4 (July 25-August 8, 1955).

Only four individual herring were caught in the eight sets made by the Theodore N. Gill, 3 on Station 2, and 1 on Station 8. Small numbers of bluebacks and alewives were caught in most sets. Reports from the Harengus are that no herring were caught on any of the 10 stations fished.

The gear used has been demonstrated in previous years to make good catches of herring where schools of these fish exist.

The Theodore N. Gill was to begin Cruise 5 on August 15 to last about 11 days.

As with preceding cruises, the principal objective will be to learn more about the habits and distribution of the herring. Of particular interest during this cruise will be the capture of samples of herring from schools of spawning fish, for it is from such fish that it may be possible to learn how many races of herring are to be found in the Gulf of Maine. Furthermore, the main spawning grounds of the species have to be located in order that the early life history of the herring can be followed in detail. The grounds on which herring have spawned in the past--between Grand Manan and Portland--will be searched with echo-ranging gear, and the herring will be caught by gill nets.

The usual plankton tows, bathythermograph casts, and continuous temperature recordings will be made.

Radio broadcasts on 2638 kilocycles will be made at 3 p.m. whenever large concentrations of herring have been located.

North Pacific Exploratory Fishery Program

"JOHN N. COBB" SAILS TO INVESTIGATE SALMON OFF ALASKA (Cruise 23): The Service's exploratory fishing vessel John N. Cobb sailed from Seattle, Wash., on June 23, 1955, on a 3-months' cruise to offshore waters of the North Pacific and

Gulf of Alaskà. At a series of predesignated stations extending from off Northern Vancouver Island to off Unalaska Island, Alaska, experimental and exploratory fishing will be conducted to obtain information on the high-seas distribution, abundance, life history, racial composition, etc., of North Pacific salmon in the Gulf of Alaska and adjacent offshore waters. Additional objectives will be to catch salmon on the high seas in condition for tagging and to collect salmon from various localities for studies of racial determination, size composition, age analysis, and other related data. Oceanographic observations in connection with these fishing activities will also be made.

The primary fishing gear will be nylon gill nets of various mesh sizes designed to catch both mature and immature salmon. A series of east-west transects will be run across the Gulf of Alaska with fishing stations at 60-mile intervals. Special attention will be given to an area southeast of Kodiak Island which is reported to be rich in plankton. A limited amount of experimental fishing will be done with surface long-line and trolling gear in addition to the gill nets.



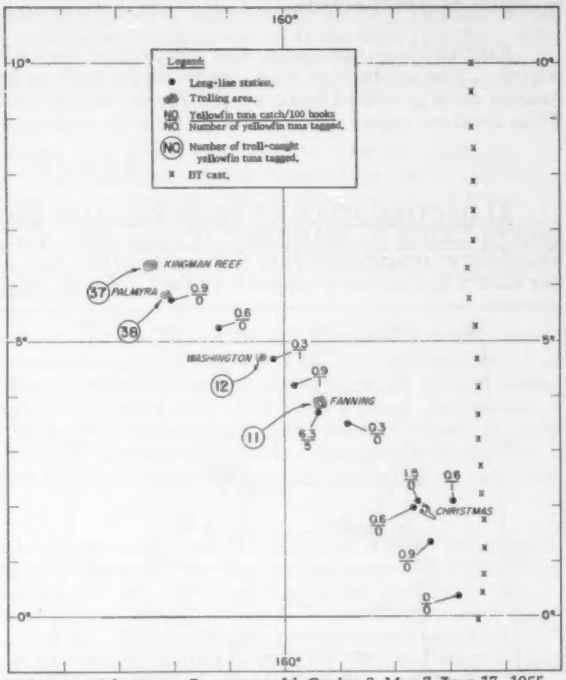
Scientific personnel from the Service's Branch of Fishery Biology and from the Department of Oceanography, University of Washington, will participate in the research. All salmon caught in suitable condition will be tagged and released. Morphometric measurements, stomach analyses, blood samples, and other biological data will be obtained. Oceanographic observations, including water samples, temperatures, etc., will be taken at each fishing station and at other regular intervals.

This cruise is part of the research program approved by the International North Pacific Fisheries Commission. Liaison will be maintained when possible between the John N. Cobb and other research vessels operating in nearby waters. Information obtained will be coordinated with that of other agencies carrying out research on North Pacific salmon.

Pacific Oceanic Fishery Investigations

SEASONAL ABUNDANCE OF TUNA IN LINE ISLANDS AREA INVESTIGATED BY COMMERCIAL CLIPPER "COMMONWEALTH" (Cruise 3): The distribution and abundance of deep-swimming and surface yellowfin and skipjack tuna in the Line Islands area was investigated by the chartered commercial clipper Commonwealth. The vessel returned to Honolulu on June 17 after a 43-day cruise scouting, trolling, and long lining for tuna.

Since its departure from Honolulu on May 7, the 112-ton vessel fished long lines and trolled for yellowfin tuna around Kingman Reef, Christmas, Fanning, Washington, and Palmyra islands of the Line Islands group, which straddle the equator about 2,000 miles south of Hawaii. This area has been established as a promising yellowfin tuna fishing ground by intensive exploratory and experimental fishing by Honolulu-based Service research vessels during the past several years. The purpose of the most recent cruise was to fill in the details of the picture of seasonal and annual changes in the abundance of tuna in Line Islands waters and to tag tuna for migration studies.



Commercial clipper Commonwealth Cruise 3, May 7-June 17, 1955.

The Commonwealth set from 20 to 30 baskets of 11-hook long lines (a total of 220 to 330 hooks) at 11 locations around the Islands, and spent an additional 13 days in trolling. The best long-lining was found about 5 miles south of Fanning Island, where 21 yellowfin were taken, or 6.3 per 100 hooks fished, a good catch rate for this type of fishing. At the other locations the abundance of tuna was considerably lower, averaging 0.6 fish per 100 hooks. In addition to yellowfin, 6 big-eyed tuna, 3 marlin, and 2 skipjack tuna were taken on the long lines.

Trolling with 6 lines for 13 days produced a catch of 100 yellowfin. The best fishing was found at Palmyra, where 20 fish were taken in one day, and at Kingman Reef, where a day's trolling yielded 24 yellowfin. Besides the tuna catch, 135 wahoo (ono) were taken on the trolling lines. These fish were measured, weighed, and examined for indications of spawning activity.

Of the yellowfin tuna catch, 106 fish were tagged and released. Length measurements of these tuna were recorded, and any recaptures, either in the Line Islands or elsewhere, will provide important evidence of the growth rate of this species as well as of its migrations.

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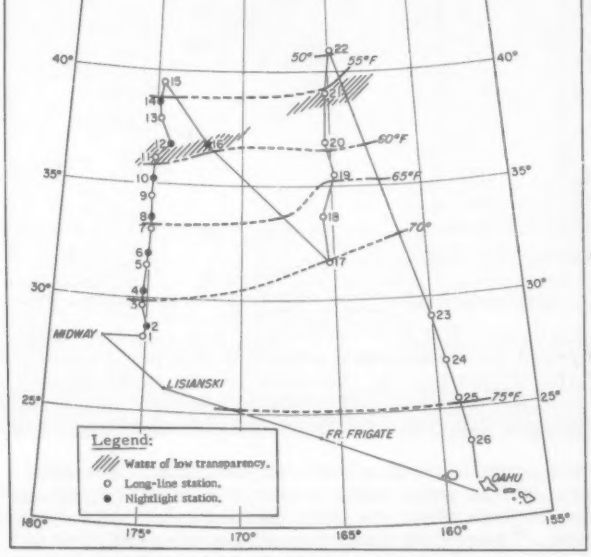
STEEL AND COTTON LONG-LINE GEAR TESTED BY HAWAIIAN VESSEL "MAKUA" (Cruise 5): A one-day cruise was made by the Territory of Hawaii's research vessel Makua on June 6 to test new methods of setting and recovering steel and cotton long-line gear off Honolulu.

In an effort to eliminate the time consumed joining and unjoining units of main line when fishing conventional long-line gear, 10 baskets each of steel and cotton long-line gear were joined to form 2 sets of continuous main line. Each of these was stowed in a 6-foot circular tub for setting. Setting of both types of gear was done at full speed--about 8.5 knots. Both cotton and steel main line ran out freely without kinking, however, the wire gear payed out unevenly and its velocity varied because of swell action.

Cotton long-line gear was recovered by using a grooved drum on the Rowe winch. The main line was coiled down both in a tub and in baskets. Steel gear was hauled on a grooved head on the Rowe winch and was stored on a single 6-foot drum. This method appeared to be superior to multiple-drum storage used previously.

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ALBACORE TUNA AT SEASONAL LOW NORTHWEST OF HAWAII IN MAY REPORTS "JOHN R. MANNING" (Cruise 25): A seasonal low ebb in albacore tuna abundance in spite of ideal fishing weather and sea conditions was reported by the Service's fisheries research vessel John R. Manning. The vessel returned to its Pearl Harbor base on June 7 after slightly more than a month of extensive fishery exploration in waters northwest of Hawaii. The cruise was one of a series being made at various seasons to test the commercial fishing potential of the area as a fishing ground for albacore tuna, the most sought-after and valuable species of tuna. This cruise was carried out simultaneously with operations of another Honolulu-based Service research vessel, the Hugh M. Smith, in waters northeast of the Islands, and with a coordinated cruise of the N. B. Scofield of the California Division of Fish and Game off the West Coast of the United States.



John R. Manning Cruise 25, May 2-June 7, 1955.

The John R. Manning sailed from Pearl Harbor on May 2, stopped at French Frigate Shoals, Lisianski, and Midway islands for a study of the potential tuna live-bait present in the lagoons, then fished a series of eight long-line stations north on the 175th west meridian to the vicinity of 40° N. latitude. Neither long-lining nor intensive trolling revealed any commercial concentrations of albacore tuna on this section, and a long trolling run to the southeast followed by another series of long-line stations along 165° W. longitude produced similarly negative results. Indications are that the albacore which earlier cruises have shown to be present in this area during the winter may migrate elsewhere en masse in the summer, perhaps to the United States and Japanese coasts, where there are active albacore fisheries at this season.

The eight long-line stations were fished between 28° N. and 40° N. latitude on the meridian of 175° W., and 6 stations on 165° W. between 31° N. and 41° N. These

sets (40 baskets of 13-hook gear or 520 hooks each) took no albacore or other tuna. Four additional sets (20 baskets of 13-hook gear) were made at stations between 29° N., 160° W., and Honolulu. The tuna catch of these stations comprised 7 large big-eyed tuna, of which 2 were tagged and released.

Six jig lines with various lures were trolled at 6-6½ knots for 5½-6 hours each day on the long-lining sections and for 14 hours each day on the runs between sections, for a total of 210 hours. One 7-pound albacore, taken at 35°38' N., 165°04' W. at a surface water temperature of 64° F., was the only tuna catch from this fishing. No indications of surface tuna schools were seen. Near the southern extreme of the survey area small dolphin, 55 to 65 cm. in total length, were fairly abundant and 19 were taken by trolling.

The principal catch of the long lines was great blue shark. As the John R. Manning worked northward along its long-lining sections, these fish decreased in average size but increased in numbers to a maximum day's catch of 54. At the northernmost stations on both sections this shark became less abundant and apparently began to be replaced by mackerel shark or porbeagle (Lamna cornubica), which were mostly of small size. The long lines also took some 41 lancetfish (Alepisaurus sp.), of which 30 were preserved for study.

In order to observe oceanographical and biological factors related to albacore occurrence, 8 night-light stations were occupied along the 175° W. section and 1 on the trolling run between sections. Saury were attracted to the light at all stations. Those collected at the southernmost stations were only 2-3 inches long, but there was a progressive increase in size to the northward to a maximum of about 10 inches. Abundance was generally low, but one concentration was thought to have had baiting potentialities for an estimated 2,000-3,000 6-inch saury gathered around the light at 35° N. in 61° F. water.

Frequent bathythermograph casts were made and the surface water temperature was recorded continuously. Fishing was done over a surface temperature range of 50° to 76° F. On both the 175° W. and 165° W. sections the water cooled to the northward in a number of irregularly spaced abrupt steps of 1° to 3° F., with occasional temporary reversals of the trend. The surface temperatures on the 165° W. section were generally higher than at the same latitudes on 175° W. but they fell off very steeply toward the northern end of the section between 39° N. and 41° N. (almost 7° F. in approximately 100 miles).

Secchi disk observations showed blue-green water of low transparency lay in a narrow band at around 36° N. on 175° W. and 39° N. on 165° W., with surface water temperatures of 56° to 60° F. This murky water was abundantly populated by salps and appeared to be the zone of greatest saury abundance.

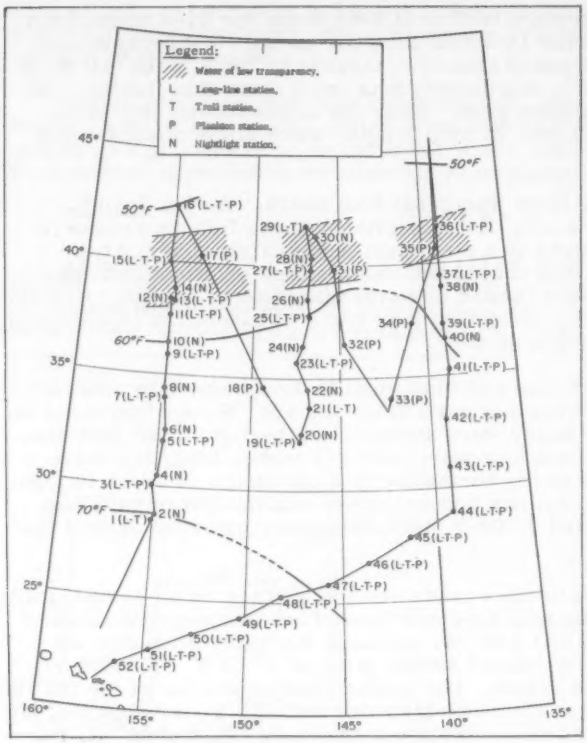
In order to assay the live-bait resources of the islands visited, surveys of the live-bait stocks were made in the lagoons of French Frigate Shoal, Lisianski Island, and Midway Island. Estimated quantities of bait fish seen at these islands were 70, 75, and 325 buckets, respectively. The bait was predominantly "iao," with smaller quantities of "piha" and "aholehole." Observations of monk seals and nesting sea birds at these islands were also recorded.

Regular fish-school and bird watches were kept when under way. Small numbers of whales, porpoise, fur seals, and sunfish were seen, and from 5 to 20 Laysan and black-footed albatross accompanied the John R. Manning at all times; other sea birds being seen only infrequently.

Calm to moderate seas, and fine weather, except for a few days of fog, prevailed throughout the cruise.

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"HUGH M. SMITH" REPORTS ALBACORE TUNA SCARCE IN MAY NORTH AND NORTHEAST OF HAWAII (Cruise 29): Only one albacore tuna was caught in an area north and northeast of Hawaii during a 43-day 6,000-mile cruise by the Service's research vessel Hugh M. Smith completed June 14. This was similar to the experience of another Service research vessel (John R. Manning) in the area northwest of Hawaii during a simultaneous cruise. The California research vessel N. B. Scofield also cooperated in this series of cruises and fished in waters off the West Coast of the United States. The primary mission of the Hugh M. Smith was to discover whether albacore tuna are present in important quantities in the waters north and northeast of the Hawaiian Islands in the early summer, and how the pattern of their distribution compares with that revealed by several similar cruises made last winter.



Hugh M. Smith Cruise 29, May 2-June 14, 1955.

The Hugh M. Smith fished with tuna long-line gear at 30 locations extending as far as 45° N. latitude and intensive trolling was carried on between long-line stations. The vessel caught only one albacore in this area which contained much larger numbers last fall and winter.

A good concentration of big-eyed tuna was found about 700 miles northeast of Hawaii on the return voyage. Fifteen of these tuna ranging in weight from 80 to 100 pounds each were tagged and released after capture on the long lines. The area of capture was outside the scope of the local sampan flag-line fishery, but it was hoped that some of the marked fish may turn up in the Hawaiian commercial catch and thus provide important information on albacore tuna migrations.

The Hugh M. Smith fished 30 long-line stations using at each station 40 baskets of 13-hook gear, 20 baskets with 5-fathom float lines, and 20 with 15-fathom float lines, alternated in groups of 10 baskets.

No albacore tuna were taken on the long lines. The total catch for the 30 long-line stations was: 71 big-eyed tuna, 1 skipjack tuna, 1 yellowfin tuna, 1 striped marlin, 2 short-nosed spearfish, 160 Alepisaurus sp., 216 great blue shark, 8 mako shark, 5 mackerel shark, 23 dolphin, 3 moonfish, 1 wahoo, and 1 leatherback turtle.

Trolling at optimum speed (6-7 knots) with 4 to 6 lines was carried out on long-line stations while patroling the long-line gear, during daylight hours while running to the succeeding long-line station, and on the trolling sections. The catch from 1,597 line-hours of trolling was 1 albacore (total length 50 cm.) and 5 dolphin. The albacore was taken at 28° 56' N. latitude, 139° 07' W. longitude.

Big-eyed tuna were taken on the long-line gear on the southern stations of 2 of the 3 longitudes fished (155° W. and 139° W.) and on the series of stations fished diagonally from 139° W. to Honolulu. Of a total of 71 big-eyed tuna caught, 62 were taken on the diagonal fishing section and 54 of these were caught on 3 successive days at 26°43' N., 143°42' W.; 25°52' N., 145°50' W.; and 25°14' N., 148°10' W. The high catches in this area probably resulted from the presence of schooling big-eyed tuna, as one school was observed following the vessel on the second of these three stations. These fish were apparently attracted to the vessel by the discarded long-line baits and the discarded viscera of landed fish. An examination of the stomach of a big-eyed tuna (124 pounds) caught at the surface with a hand line revealed 35 herring (long-line bait). Examination of stomachs of a few long line-caught big-eyed tuna also revealed long-line baits and tuna viscera.

The recording thermograph was run continuously throughout the cruise and showed a gradual decrease in temperature northward on all sections. There were no drastic temperature discontinuities noted. A study of the subsurface temperatures showed a very shallow thermocline, which was indistinct on many occasions. Salinity samples were taken at each station and at BT casts between stations.

Most of the 34 plankton hauls yielded very small collections. Only those hauls taken north of 37° N. latitude resulted in heavy catches. The biggest haul (filling 3 half-gallon jars) was made at 37°40' N., 154°49' W., and consisted mostly of salps.

Fifteen 1-hour night-light stations were made on the 3 north-south long-line fishing sections. A careful observation of the saury showed that generally juvenile fish (1 to 3 inches) were found in the more southern latitudes while the larger saury (8 to 10 inches) were located farther north. Not more than 25-50 saury were seen at any one time.

One unidentified school of fish was observed breaking water at 37°40' N., 154°49' W. Other observations showed numerous flocks of birds between 37°-40° N., and sightings of fur seals were not uncommon in the northern section of the area covered.

Other biological work conducted on the cruise included: (1) a total of 19 tunas (1 albacore, 17 big-eyed, 1 yellowfin) were tagged with plastic vinylite tags and released; (2) stomachs were preserved from 41 big-eyed and 1 skipjack tuna and gonads from 16 female big-eyed were also saved; (3) morphometric measurements were taken from 45 big-eyed, 1 skipjack, 1 short-nosed spearfish, 1 mako shark, and 2 mackerel sharks; (4) eleven Alepisaurus sp. were saved; (5) secchi-disc lowerings were made at each long-line fishing station and the results showed clear water (12-14 fathoms) up to 38° N., then a region of turbid water (6-7 fathoms), which on 155° W. was followed again by clear water at 42° N. latitude.

Good weather was prevalent throughout most of the cruise, with only one long-line fishing station (most northern station on 139° W. longitude) omitted because of adverse weather. Weather reports were sent daily through the Coast Guard at 1200 GCT.

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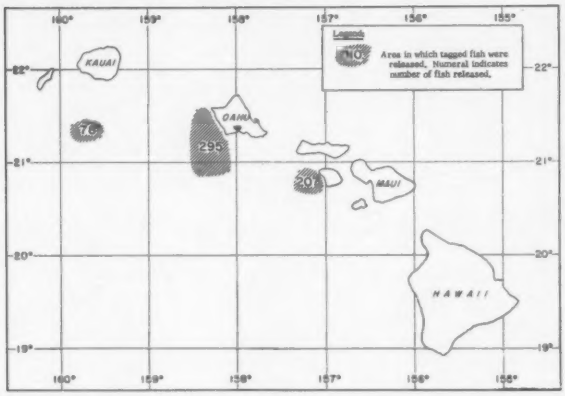
FIRST TAGGED TUNA RECOVERIES IN HAWAIIAN WATERS: The efforts of fishery researchers and commercial fishermen to trace the migrations of Hawaii's skipjack tuna (aku) schools have begun to bear fruit with the recapture of two tagged tuna near Lanai on July 12, according to the Director of the Service's Pacific Oceanic Fishery Investigations. The fish, caught by the sampan Olympic, had been marked and released by the Service's research vessel Charles H. Gilbert in the same area on June 1 and 8 of this year. At the time of tagging the two skipjack tuna were in different schools, both composed of fish weighing about 7 pounds. During the period from May 30 to June 8 a total of 207 aku were tagged in the Lanai area.

Although these recaptures do not provide any evidence of spectacular migrations, but indicate rather that the schools of small skipjack are comparatively stationary at this season, they do give encouraging indications that the fish can survive the handling necessary for tagging and the encumbrance of a vinyl plastic tube threaded under the skin of their backs behind the dorsal fin. This type of tag, developed and widely used by the State of California, has made some astounding records on other species of tuna, as for example in the case of an albacore tuna marked in September 1954 off the California coast and recaptured in Japanese waters in April 1955. Local fishery scientists hope that this record may eventually be rivaled by fish tagged in Hawaiian waters.

There is now a total of 1,799 tuna of various species swimming about the Pacific, trailing plastic tubing inscribed with a Honolulu return address. They include 80 albacore, 73 big-eyed, 621 yellowfin, 1 kawakawa (little tunny), and 1,024 skipjack. The program is continuing, with 121 more aku tagged in 2 days aboard the Charles H. Gilbert recently, and with additional tagging on July 7 aboard the commercial fishing sampan Venus. Fishermen have been informed by means of posters and press releases to be on the lookout for tagged fish.

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MORE SKIPJACK TUNA TAGGED BY "CHARLES H. GILBERT" NORTHWEST OF HAWAII (Cruise 21): A total of 580 skipjack tuna was tagged with the California type G tag northwest of Hawaii by the Service's research vessel Charles H. Gilbert during a one-month cruise ending June 10. Of these 563 were of the 4½- to 10-pound size, while 17 were of the 25- to 30-pound size. Of the smaller fish, 78 were released southwest of Kauai, 27 southwest of Pearl Harbor, 251 off the Waianae coast, and 207 off the west coast of Lanai. The 17 larger fish were released southwest of Oahu.



Charles H. Gilbert Cruise 21, May 18-June 9, 1955.

Experiments were made with electricity as a possible means of reducing injuries to fish during the tagging. Electronarcosis was tried on skipjack tuna from 4 different schools. Alternating current of 10, 15, and 20 volts was used on one school of 5- to 8-pound skipjack. Direct current of 6, 13, 19, and 26 volts was used on 2 schools of 5- to 8-pound skipjack and direct current of 13, 19, and 26 volts was used on 1 school of 18- to 24-pound skipjack. In general the results were very erratic and of such a nature as to discourage the use of electricity as a means of quieting skipjack for tagging.

To obtain skipjack for use in honeycombing experiments, 80 5- to 9-pound skipjack, and 90 25- to 30-pound skipjack were obtained.

Surface temperatures were obtained through continuous use of the thermograph. Subsurface temperatures were obtained by use of the BT wherever fish were caught and at other irregular intervals.

Various lures were used on four trolling lines. A total of 6 fish were caught--4 dolphin and 2 yellowfin tuna.

Two small yellowfin tuna caught May 13 were delivered to Coconut Island on May 14. These fish were not tagged.

Whenever possible broadcasts were made to the local fleet on a twice-daily scheduled broadcast, although on a few occasions they were unintentionally omitted. Response from the fleet indicates that these broadcasts were useful to commercial fishermen.

Bait mortality was a major factor contributing to the number of days required for baiting. Often 90 percent of the nehu (anchovy) placed in the tanks died before being used. This was especially true during the first half of the cruise. Bait obtained from Pearl Harbor seemed much less hardy than that obtained in the relatively open waters of Maalaea Bay. In attempting to trace the cause of the mortality, a number of oxygen determinations were made of the water in the tanks. Preliminary evaluation of these tests does not indicate that lack of oxygen was the cause of death.



Saltonstall-Kennedy Act Fisheries Projects

ADVISORY COMMITTEE ENDORSES VIGOROUS FISHERY RESEARCH: The vigorous program of fishery research and market development which the U. S. Fish and Wildlife Service is undertaking in the current fiscal year has received the strong endorsement of the American Fisheries Advisory Committee, Secretary of the Interior Douglas McKay said September 2.

Plans for some 100 projects being financed under the Saltonstall-Kennedy program to promote trade in domestically-produced fishery products were outlined to the Advisory Committee at its meetings in Boston on August 25 and 26, Director John L. Farley of the Fish and Wildlife Service informed Secretary McKay.

The Committee of experts from the commercial fishing industry was particularly pleased with the departmental policy of contracting with educational institutions and private research organizations, Director Farley reported.

Of the $3,000,000 allocated in the first year of the Saltonstall-Kennedy program which ended last June 30, Director Farley said, the Fish and Wildlife Service contracted for $1,311,000, or about 44 percent of the work, under the program. It is expected that a similar proportion of the program work for the current year will be done outside the Government under auspices of the Fish and Wildlife Service.

Director Farley, who substituted for Assistant Secretary Orme Lewis as chairman of the Advisory Committee at the Boston meetings, said the committee reviewed programs totaling some $2,730,000 for which funds already have been allocated out of the current year's $3 million Saltonstall-Kennedy Appropriation. Plans for expenditure of the remaining $270,000 also were discussed, he said.

A report on accomplishments during the first year of the program was presented by Director Farley, A. W. Anderson, Chief, Branch of Commercial Fisheries, and Dr. L. A. Walford, Chief, Branch of Fishery Biology.

The broad policy recommendations adopted by the Committee at its first meeting in Washington were reaffirmed and continuance of the Service's present program was urged.

The Advisory Committee discussed a proposal suggesting that part of the Saltonstall-Kennedy funds be apportioned among the States but advised against this type of

apportionment. Instead, the Committee recommended that funds continue to be made available to research organizations on a contract basis for specific types of research and educational and marketing activities as provided for by the Act. At its April meeting, the Committee had recommended against committing funds for major construction projects, a policy which was adopted and has since been followed by the Department.

While in Boston, the members of the Committee were taken on a complete tour of a modern plant processing fish sticks and precooked fish fillets.

Future meetings of the Committee, according to Director Farley, will be scheduled with two ideas in mind: (1) to provide an opportunity for the Committee to study important recent developments in various fish-producing centers of the United States; and (2) to learn at first-hand of problems confronting segments of the domestic fishing industry. The Committee's next meeting will be held at Long Beach, Calif., in the spring of 1956.

The 15 members of the Committee who attended the Boston meeting were: Harold R. Bassett, Salisbury, Md., Lawrence Calvert, Seattle, Wash., James S. Carlson, Boston, Mass., E. M. Concannon, Chicago, Ill., Mark L. Edmunds, Garibaldi, Oreg., David H. Hart, Cape May, N. J., Donald P. Loker, Terminal Island, Calif., Arthur H. Mendonca, San Francisco, Calif., J. Richards Nelson, Madison, Conn., Moses B. Pike, Eastport, Maine, H. F. Sahlman, Fernandina Beach, Fla., Thomas F. Sandoz, Astoria, Oreg., Arthur Sivertson, Duluth, Minn., Lawrence W. Strasburger, New Orleans, La., and George R. Wallace, Morehead City, N. C.

Three members, Leon S. Kenney, St. Petersburg, Fla., Earl B. Webster, Brownsville, Tex., and Alphonse J. Wegmann, Pass Christian Isles, Miss., were unable to attend.

Some of the major projects already undertaken with funds made available by the Saltonstall-Kennedy Act are: (1) development of voluntary Federal grades and standards for fishery projects; (2) development of a chemical test as a measure of the nutritive value of fish meal; (3) development of new uses for fish oils; (4) exploration of deep-water fishing grounds in the North Atlantic; (5) research on fluctuation of the California sardine; and (6) study of causes and control of toxic red tide off the Florida coast.

Under the Saltonstall-Kennedy Act, the Secretary of the Interior is authorized to appoint a group of experts from the domestic fishing industry to advise him on industry problems embraced by the legislation. The Advisory Committee consists of 19 representatives of the industry, appointed to serve until June 30, 1957.

Some accomplishments credited to the Saltonstall-Kennedy program during its first year include:

Two joint industry-Government sales promotion campaigns were conducted to move into trade channels excessive stocks of haddock and canned tuna. Both were highly successful.

Through exploratory fishing operations, significant catches of shrimp were made in deep water in the North Atlantic south of Nova Scotia by the Service's vessel Delaware, within range of the larger New England trawlers. Large ocean perch also have been taken in deep water.

The first of the voluntary standards of grade and condition for fishery products has been developed and drafted. This set of standards--for fish sticks--is being reviewed by the industry and a final draft will be prepared as soon as all comments have been received.

In the field of biological research, a light float plane used in red tide research has not only demonstrated a saving of time and money but it has given increased coverage of the long Florida coastline. Use of this plane permits early detection of a red-tide outbreak so that application of control measures can be applied immediately.

The operation of a research vessel at sea has given increased scope to data collection over the Pacific sardine spawning areas which has made possible a prediction of bigger catches in this year's fall and winter fishery.

School-Lunch Program

PRECOOKED FISHERY PRODUCTS WELL ACCEPTED IN SCHOOL LUNCHROOMS: To the school-lunch manager looking for a fish dish that is easy to prepare and that pupils will like, precooked fish sticks and fillets can be the answer. Delivered to the school kitchen packaged and frozen, easy to prepare and accurately portioned, the two ounces of protein required for the Type-A lunch is conveniently met and without waste.

Precooked fishery products were introduced to the school-lunch program about two years ago and have steadily increased in popularity since then. School-lunch managers in Massachusetts and North Carolina schools, for instance, say that precooked fish sticks have found enthusiastic school-lunch acceptance by students who have consistently refused to eat fish prepared by other methods. But, equally as important, is the fact that when the children return to their homes and indicate their desire for fish sticks, the household market is also increased, for finding foods that attract children is a problem for every parent.



Fish sticks and other precooked fishery products are being used regularly by school lunchrooms.

Fish sticks and other precooked fishery products are now available throughout the country and are being used regularly by school lunchrooms in the feeding of thousands of school children in the United States.

State school-lunch programs are required to serve two ounces of cooked protein in each Type-A school lunch. Precooked fish sticks, which are served as two one-ounce sticks to each Type-A school lunch, meet this requirement.

The school-lunch program operates in every state in the union and is responsible for the feeding of over 9 million students daily throughout the school year. Each year the program reaches more children and every year the schools serve better meals. More than two out of every three meals served now meet the Type-A requirement, reports the January 1955 issue of Practical Home Economics.

Service's Program to be Maintained at High Level for 1956

With close to $55 million available in appropriated and special funds, programs of the U. S. Fish and Wildlife Service in the next 12 months will continue at the same high level as in the past fiscal year, Secretary of the Interior Douglas McKay announced July 31.

"The Department's work in helping protect and expand the priceless fish and wildlife resources of our country is more important than ever with the number of hunters and fishermen increasing by leaps and bounds each year," Secretary McKay said. "We intend to carry it forward with the utmost vigor."

Funds appropriated directly by the Congress for use in fiscal 1956 amount to $12,675,500. This is an increase of $1,222,500 over the 1955 amount.

Appropriated funds, however, constitute only about one-fourth of the total available to the Service. About three-fourths of the Service's appropriations come from special funds such as the revenue from duck stamps, taxes on fishing tackle, and arms and ammunition, and other sources.

In addition to the $3 million which the Service will have for an expanded fishery program during the second year of the Saltonstall-Kennedy Act, a direct appropriation of $1,108,000 will be available for research and marketing programs to aid the commercial fishing industry.

About $353,000 will be expended during fiscal year 1956 in the exploration of new fishing grounds to determine the character, extent, and availability of the deep water resources.

Exploration of the North Pacific for offshore salmon populations and exploratory surveys in the Gulf of Mexico for additional information on the tuna and shrimp resources will highlight the 1956 program. During 1955 Service exploration in the Gulf of Mexico turned up a remarkable discovery of a subsurface population of tuna.

Fishery technological research is intended to promote the most efficient utilization of marine products and is designed primarily to assist industry in improving methods of handling, processing, and marketing these products. With funds of $282,000, main emphasis in 1956 will be placed on quality control through development of voluntary standards of grade and condition for fishery products. Standards are already being developed for fish sticks and frozen haddock fillets. The fishing industry has recently displayed considerable interest in the development of adequate standards and grades. Most of this work will be centered at the Service's Boston, Mass., and College Park, Md., fishery laboratories. The effects of freezing and cold storage on fish in order to improve the products which reaches the consumer is the subject of extensive research.

The increasing importance of international trade in fishery products and the larger imports of these products into the United States from foreign countries is resulting in considerable attention being given to the collection and analysis of import and export data for the guidance of the fishing industry. Other economic studies of domestic marketing situations will be made to aid the industry and Government in maintaining the orderly output of fishery products. For fishery economic studies, $43,000 will be available in 1956.

Statistical coverage of the fishing industry as a basic part of the program will provide management and research personnel with valuable data on employment, production trends, stocks in cold storage, and other needed production and marketing facts. Funds for this work amount to $150,000.

The Service's seven Market News offices, located at important fish-producing and consuming areas in the United States, will continue the issuance of daily reports on supply, demand, market, and prices. Funds for this purpose amount to $280,000.

The Service received direct appropriations of $2,489,000 in 1956 for fishery biological research. This amount is divided among the following activities; coastal and offshore fishery research, $1,655,000; commercial fishery research, $213,600; inland fishery research, $590,400; and $30,000 for designing fish protective devices.

In addition to the direct appropriations, many of these activities will benefit from Saltonstall-Kennedy and other funds.

The direct appropriation includes $350,000 for research on the Great Lakes fisheries, with particular emphasis on the development of economical methods for controlling sea lampreys and the operation and maintenance of experimental and interim sea lamprey control devices in streams tributary to Lakes Michigan and Superior. The funds so provided will keep up the United States' share of research and control until an International Commission for the Great Lakes can be established as provided in the Treaty signed September 10, 1954, and ratified by the President, with the consent of the Senate, on June 1, 1955.

The administration of the various fish and game laws in the United States and Alaska which the Service is charged with enforcing will have $3,589,100 in 1956 from all sources. This includes the administration of the Alaska fisheries and the Alaska game laws, enforcement activities under the Migratory Bird Treaty and Lacey Acts, enforcement of the Black Bass, Bald Eagle, Sockeye Salmon, and Northern Pacific Halibut Acts, administration of the Whaling Treaty Act and the Northwest Fisheries Convention Act. In connection with enforcement of the haddock provisions under the Northwest Fisheries Convention Act, Congress provided an extra $8,500 to the Service for the employment of an experienced fishery law enforcement officer who will be headquartered at Gloucester, Mass.

Funds available for the Service's Federal Aid in Wildlife and Fish Restoration programs under the Pittman-Robertson and Dingell-Johnson Acts are expected to be somewhat in excess of last year's, with around $11 million anticipated for wildlife and about $5 million for sport fish work. These funds are of vital importance in the restoration and better management of the fish and wildlife resources in the 48 States.

Implementation of recommendations made by a Survey Team designed to increase efficiency and produce greater results with available funds will be continued in fiscal year 1956 with an increased appropriation of $35,000.

The Team's recommendations, approved by the Secretary on July 2, 1954, emphasized the need to decentralize authority from Washington to regional offices so as to promote closer cooperation with the States. These new funds will provide assistance to regional directors so they may assume additional delegations of authority.

The Service will use $210,000 in 1956 to continue construction of two new hatcheries at Millen, Ga., and North Attleboro, Mass., and to erect new buildings at the Pittsford, Vt., Welaka, Fla., and Springville, Utah, stations.

A substantial increase in the output of hatchery-reared fish for stocking inland lakes and streams is expected to result from additonal funds amounting to $305,000 which were appropriated to the Service in fiscal year 1956 for its fish propagation and distribution work.

At the present time the Service operates 89 fish-cultural stations in 42 States. In calendar year 1954, these hatcheries produced and distributed 208,000,000 fish, weighing 1,393,000 pounds.

For 1956, funds to provide for the maintenance of hatcheries, equipment, and fish screens were increased by $155,000. This will permit a more adequate program of maintenance at hatchery installations and the necessary replacement of equipment.

An additional $150,000, to step up fish production, was added to the operating allotments of 28 hatcheries for which Congress provided funds for improvement and expansion of facilities in the past five years. These hatcheries are located in areas where the demand for fish for stocking purposes has greatly exceeded the present production of these units. The increase of $150,000 will permit the expanded facilities at these units to be utilized to 92 percent of capacity. Also the Service will resume in 1956 its important mussel propagation program which was temporarily discontinued.

In Alaska, where the commercial fisheries provide the chief source of wealth and employment, and a major source of tax revenue, the Service's salmon conservation program in 1956 will continue at the same level as in the past two years. Better coordination of field activities and improvement of law enforcement and management programs can be expected as a result of the recent reorganization of the field staff.

"For fur-seal work on the Pribilof Islands expenditures during 1956 will total about $1,231,000. During this period, contractors will complete construction of houses, school, and hospital buildings, warehouses, and other facilities for the native Aleut population of the Islands at a total cost for the program of $1,500,000."

Congressional funds of $337,000 provide an increase of $74,000 for studies in connection with water resource developments to determine means for lessening any adverse effect on the fish and wildlife resources. Moreover, the funds provided are subject to less limitation on use than in previous years, since they provide for the financing of a "hard-core" staff for river basins investigations for the first time.

One of a number of major studies during 1956 will be in connection with the extensive Central and Southern Florida project of the Corps of Engineers, authorized by the Congress in 1954. A project of this magnitude can be expected to have widespread effects on fish and wildlife resources, including coastal fisheries. Units of the project will be studied and constructed by the Corps over a number of years. The size and importance of this project led the Fish and Wildlife Service to establish a new field office at Vero Beach, Fla., in 1955 to conduct necessary studies. In 1956 this office will be expanded and the studies will be accelerated.

Service Expanding Motion-Picture Program

One of the most effective methods of publicizing fisheries and fishery products is through the use of motion pictures. Many commercial fishing firms have found that a motion picture serves as a good follow-up to their sales and promotional activities.

The U. S. Fish and Wildlife Service is expanding its educational fishery motion-picture program, and at the present time four pictures are in various stages of production. These will be in addition to the 10 that already have been produced and placed in circulation. The new production schedule includes:

1. Fishing With an Outboard, being produced cooperatively with Johnson and Evinrude Divisions of Outboard, Marine and Manufacturing Company.

2. Shrimp Tips from New Orleans, being produced cooperatively with the Peelers Company of New Orleans, La., manufacturers of shrimp peeling and deveining equipment.

3. Film on standards of fish sticks and other breaded fishery products--title not yet selected.

4. General interest film on the Nutritive Value of Fish.

In order to meet the heavy demands for these pictures from business, educational, and civic groups, the Service is now distributing its films through more than 100 film libraries. Before the end of the year it is anticipated that this number will be increased to 150.

Members of the fishing industry interested in borrowing prints of the pictures can do so by addressing their requests to the Branch of Commercial Fisheries, Fish and Wildlife Service, U. S. Department of the Interior, Washington 25, D. C.

Many of the films have also been cleared for television showing. More detailed information is available in Fishery Leaflet 255, which is also available from the Service.



Shooting a scene for the 16 mm. motion picture Fishing with an Outboard being produced cooperatively by the U. S. Fish and Wildlife Service and Johnson and Evinrude Divisions of Outboard, Marine and Manufacturing Company.

South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, APRIL-JUNE 1955: Oyster Research: Continuing the taxonomic study on the boring sponge and their affect on oysters by the State of South Carolina's Bears Bluff Laboratories, a collecting trip was made aboard the 40-foot research vessel from Bears Bluff northward to the Santee River, to collect samples of sponged oysters. The trip extended from April 12 through April 15. Specimens were collected in as many environments as possible. Oysters in the South Santee River have become infested with a large population of oyster drills--Urosalpinx. Presumably this increase in infestation is due to the high salinity now prevalent in the Santee River, according to Progress Report No. 24 from the Bears Bluff Laboratories.

Shrimp Investigation: During April, May, and June a survey of the waters beyond the commercial fishing grounds was carried out aboard the 65-foot research vessel recently secured from the Department of the Army. A total of 131 experimental drags were made with 20- and 30-foot otter trawls (see maps). Few shrimp

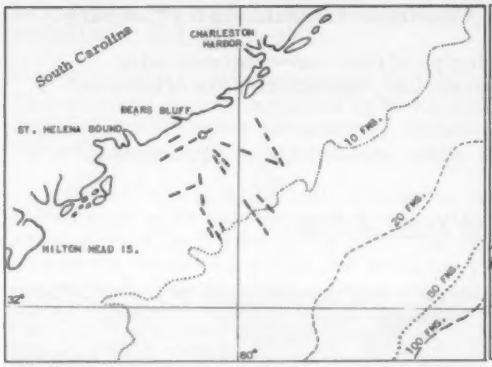


Fig. 1 - April 1955 explorations (38 drags) beyond the commercial fishing grounds off South Carolina by that State's research vessel. Each dash indicates an area investigated.

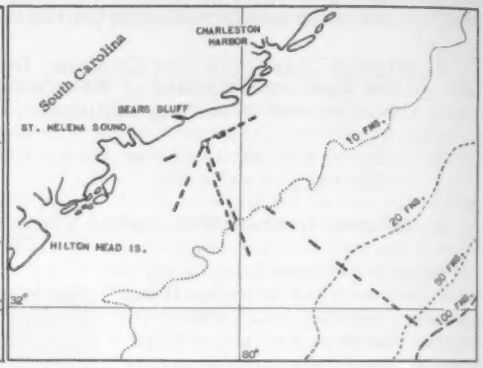


Fig. 2 - May 1955 explorations (50 drags) beyond the commercial fish grounds off South Carolina by that State's research vessel. Each dash indicates an area investigated.

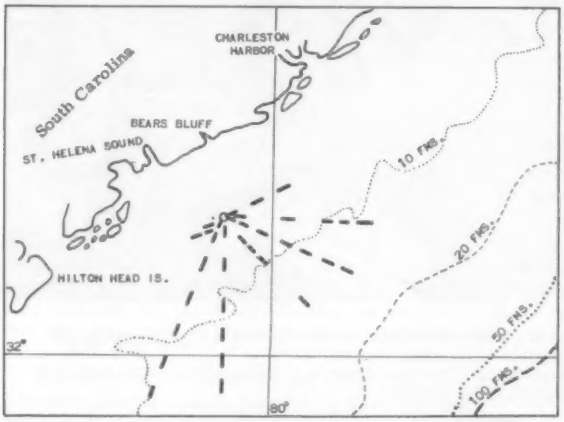


Fig. 3 - June 1955 explorations (43 drags) beyond the commercial fishing grounds off South Carolina by that State's research vessel. Each dash indicates an area investigated.

were found beyond the normal shrimping grounds. Many specimens of unusual and seldom locally-seen marine life were taken, particularly in the vicinity of the 10-fathom curve on sponge beds. In addition to experimental trawling some hook-and-line fishing was tried. Sea bass or black fish were abundant at 10 fathoms. Red snapper, vermillion snapper, and scup or porgy (Sparidae sp.) were readily caught at 25-30 fathoms.

Figures 1, 2, and 3 show the work thus far accomplished. Each dash indicates an area investigated. Catches are analyzed, and position, water temperatures, and depths are recorded.

In continuing the study of the shrimping industry in South Carolina, the 40-foot research boat was used sparingly during this quarter until the first part of June when a piston disintegrated in the main engine while the boat was operating in the mouth of St. Helena Sound.



Swift Resigns from Fish and Wildlife Service Post

The resignation of Ernest F. Swift as Assistant Director of the U. S. Fish and Wildlife Service was announced August 25 by Acting Secretary of the Interior Clarence A. Davis.

Swift has accepted an offer to become Executive Director of the National Wildlife Federation, effective October 1. Federation headquarters are located in Washington, D. C.

Swift was appointed Assistant Director of the Fish and Wildlife Service on March 17, 1954, and has been concerned primarily with wildlife activities and field operations of the Service.

Prior to joining the Service, Swift had been associated with the Wisconsin Conservation Department since June 1926, serving as Director of the Department from November 1947 until he accepted the Federal appointment.

U. S. Commercial Fisheries Estimated Expenditures, 1954

Expenditures of the United States commercial fisheries in 1954 were estimated at $626 million, according to data compiled by the Service's Branch of Commercial Fisheries (table 1). This is the amount spent by the fisheries over and above the expenditures for raw materials, purchases, compensation of fishermen, direct and indirect labor, losses for depreciation, and taxes.

Table 1 - Estimated Expenditures, of the United States Commercial Fisheries, 1954[1/]

Type of Business	Value
	$ Million
Vessel owners	141
Processors and canners	208
Wholesalers	125
Retailers	152
Total	626

1/ Does not include expenditures for raw material, purchases, compensation of fishermen, direct and indirect labor, losses for depreciation, and taxes.

The processors and canners of fishery products expended the largest share of these expenditures--$208 million. Retailers, vessel owners, and wholesalers followed in that order.

The vessels owners spent an estimated $141 million in 1954 (table 2). The largest expenditures by this group was for boat supplies and repairs. Food for the crew and fuel were also major items for vessel owners.

The processors and canners of fishery products in the United States during 1954 had expenditures estimated at $208 million (table 3). Cost of containers (cans, cases, and labels) was by far the major item for this group, comprising almost one-half the total expenditures. Condiments and sales and brokerage costs were the next most costly items for the fishery products processors and canners in 1954.

Table 2 - Fishermen Vessel Owners' Estimated Expenditures for Specified Items, 1954[1/]

Item	Total Income	Value
	%	$ Million
Total income	100	345
Estimated expenditures:		
Boat supplies and repairs	11.8	40
Fishing gear and nets	3.7	13
Ice	4.0	14
Fuel	7.2	25
Food for crew	7.5	26
Insurance	4.4	15
Other	2.4	8
Total	41.0	141

1/ Does not include depreciation, direct and indirect labor, compensation to fishermen and taxes.

Table 3 - Fishery Products Processors and Canners' Estimated Expenditures for Specified Items, 1954[1/]

Item	Total Income	Value
	%	$ Million
Total income	100	580
Estimated expenditures:		
Transportation to cannery	1.2	7
Condiments	5.1	30
Insurance	1.2	7
Cans, cases, and labels	17.7	103
Repairs	1.9	11
Warehousing and freight	2.4	14
Sales, brokerage	3.1	18
Heat, light, and power	0.6	3
Advertising	1.6	9
Bank interest and miscellaneous expenses	1.0	6
Total	35.8	208

1/ Does not include depreciation, direct and indirect labor, raw material, and taxes.

Fishery products wholesalers in the United States spent $125 million in 1954 (table 4), divided among many items. The largest of these was the expenditures for delivery of fishery products.

Table 4 - Fishery Products Wholesalers' Estimated Expenditures for Specified Items, 1954 1/

Item	Total Income	Value
	%	$ Million
Total income	100	820
Estimated expenditures:		
Rent	1.6	13
Packaging supplies	2.0	16
Delivery expenditures	3.5	29
Refrigeration costs	1.0	8
Telephone and telegraph	0.6	5
Repairs	0.3	2
Heat, light, and power	1.8	15
Advertising	0.5	4
Insurance on buildings	0.5	4
Insurance on merchandise	0.7	6
Ice and water	0.5	4
Salesmen brokerage	1.5	12
Collection of debts and miscellaneous expenses	0.8	7
Total	15.3	125

1/ Does not include purchases, wages and salaries, depreciation, and taxes.

Table 5 - Fishery Products Retailers' Estimated Expenditures for Specified Items, 1954 1/

Item	Total Income	Value
	%	$ Million
Total income	100	1,070
Estimated expenditures:		
Rent	3.6	39
Ice and storage (warehousing)	1.4	15
Wrapping supplies	2.4	26
Delivery	1.8	19
Repairs	0.9	10
Gas and electricity	0.5	6
Telephone and telegraph	0.4	4
Insurance	0.7	7
Advertising	1.4	15
Laundry	0.7	7
Miscellaneous	0.4	4
Total	14.2	152

1/ Includes fish retailers and fish departments in combination and chain stores. Does not include purchases, depreciation, wages and salaries, and taxes.

Retailers of fishery products (including departments in combination and chain stores) spent $152 million in 1954 (table 5). Rent was the largest expenditure, followed by wrapping supplies, delivery, advertising, ice, and storage in that order.



U. S. Foreign Trade

FISH-STICK DUTIES EFFECTIVE JULY 24: The new duty rates affecting imports of fish sticks as provided for in Public Law 689, 83d Congress (68 Stat. (pt. 1) 896) became effective on July 24 when the President notified the Secretary of Treasury to that effect on July 22. These duties were negotiated with Canada at recent meetings of the General Agreement on Tariffs and Trade. The fish-stick duties, as published in the July 28 Federal Register, read as follows:

"SEC. 2 (a) Paragraph 720 of title I of the Tariff Act of 1930 (U.S.C., 1952 edition, title 19, sec. 1001, par. 720), is amended by adding at the end thereof the following subparagraph:

> "'(d) Fish sticks and similar products of any size or shape, fillets, or other portions of fish, if breaded, coated with batter, or similarly prepared, but not packed in oil or in oil and other substances, whether in bulk or in containers of any size or kind, and whether or not described or provided for elsewhere in this Act, if uncooked, 20 per centum ad valorem; cooked in any degree, 30 per centum ad valorem.'"

The proclamation signed by the President on July 22, 1955, gives effect to the results of the recent negotiations for the accession of Japan to the General Agreement on Tariffs and Trade. Under the Protocol for the Accession of Japan, which was signed for the United States on June 8, 1955, Japan became a contracting party, and the concession negotiated between the United States and Japan became effective on September 10, 1955. By August 11, 1955, two-thirds of the contracting parties to the General Agreement had cast the required favorable votes for the accession

of Japan under the terms of the protocol. The proclamation provides that the date of entry into force of the concessions negotiated by the United States shall be notified by the President to the Secretary of the Treasury and published in the Federal Register. An analysis of the results of these negotiations was issued by the Department of State on June 9, 1955.1/

The letter from the President to the Secretary of the Treasury, carrying out the Protocol of terms of accession by Japan to the GATT and other purposes, appeared in the July 28 Federal Register as follows:

LETTER OF JULY 22, 1955

[CARRYING OUT THE PROTOCOL OF TERMS OF ACCESSION BY JAPAN TO THE GENERAL AGREEMENT ON TARIFFS AND TRADE AND FOR OTHER PURPOSES]

THE WHITE HOUSE,
Washington, July 22, 1955.

MEMORANDUM FOR THE SECRETARY OF THE TREASURY

Reference is made to my proclamation of July 22, 1955 [2] carrying out the Protocol of Terms of Accession by Japan to the General Agreement on Tariffs and Trade and for other purposes.

Pursuant to the procedure described in Part II of that proclamation, I hereby notify you that the two agreements referred to in the thirteenth recital of the proclamation will enter into force on July 24, 1955.

I also notify you that the amendment to the Tariff Act of 1930 made by section 2 of Public Law 689, approved August 28, 1954, with respect to duties applicable to certain prepared fish shall enter into force on July 24, 1955.

DWIGHT D. EISENHOWER

[2] See Proclamation 3105, *supra*.

As a result of the provisions of the exclusive trade agreement between the United States and Cuba, concluded on October 30, 1947, certain reductions in rates negotiated in connection with the accession of Japan will result in the elimination of the preferential tariff treatment now enjoyed by like Cuban products. Fresh or frozen frog legs are included in the list of Cuban products which change in duty with the entry into force of the Protocol for the accession of Japan. The previous Cuban preferential rate was 8 percent ad valorem, and the new rate applicable both to other GATT countries and Cuba is 5 percent ad valorem.

1/See Commercial Fisheries Review, August 1955, pp. 62-63.

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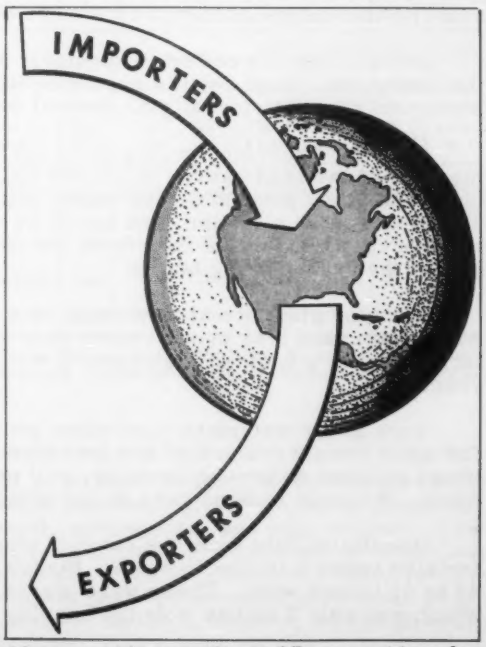
EDIBLE FISHERY PRODUCTS, MAY 1955: United States imports of fresh, frozen, and processed edible fish and shellfish in May 1955 totaled 57.1 million pounds (valued at $17.1 million), according to a Department of Commerce summary tabulation (see table). This was only a very slight decrease in quantity but a 16 percent-drop in value as compared with April imports of 57.2 million pounds. Compared with a year earlier, May imports were down 18 percent in quantity and 7 percent in value.

United States Foreign Trade In Edible Fishery Products, May 1955 With Comparisons

Item	May 1955		May 1954		Year 1954	
	Qty.	Value	Qty.	Value	Qty.	Value
	....(In Millions of Lbs. & $).....					
Imports:						
Fish & shellfish: fresh, frozen, & processed 1/	57.1	17.1	69.9	18.3	801.7	202.8
Exports:						
Fish & shellfish: processed 1/ only (excluding fresh and frozen)	7.9	1.4	3.1	0.7	50.8	13.2

1/ Includes pastes, sauces, clam chowder and juice, and other specialties.

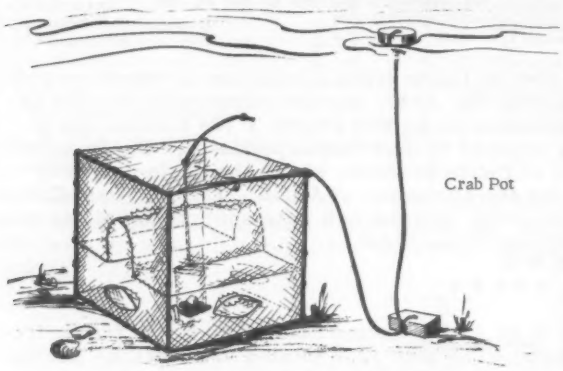
Source: United States Foreign Trade (Trade by Commodity), Summary Report FT 930, May 1955, U. S. Department of Commerce.



Exports of processed edible fish and shellfish (excluding fresh and frozen) in May 1955 amounted to 7.9 million pounds (valued at $1.4 million). This was a decrease of 12 percent in quantity and 46 percent in value as compared with April exports of 9.0 million pounds (valued at $2.6 million). May 1955 exports were up 155 percent in quantity and 100 percent in value as compared with a year earlier.

Virginia

INCREASED CRAB CATCH PREDICTED: The Virginia crab industry, watermen and dealers alike, are looking for an abrupt increase in the blue-crab catch this August, reports a July 13 release from the Virginia Fisheries Laboratory. Because of the scarcity of crabs which began about a year ago, crabbers are anxiously watching for signs of the new brood of crabs that will be the mainstay of their catch for next year. The hatch of 1954 appears to have been good, judging from the large numbers of little crabs in the creeks this summer. Many of these will reach full size in August.


Crab Pot

Crab research biologists at the Virginia Fisheries Laboratory at Gloucester Point are venturing to predict the future success of crabbing by measuring the abundance of small crabs. Predictions have been made since 1953. The bumper crop of 1953/54 and the scarcity that began in August 1954 were successfully predicted.

Small crabs are collected regularly at five selected areas in the York River by the biologists. Good results are reported with a small experimental scrape. The biologists expect to investigate several other Bay areas eventually.

Crab pot fishermen in July were catching fair numbers of 3- and 4-inch crabs, the first of the 1954 hatch. While the watermen were glad to see so many small crabs, for they portend a good supply this fall and winter, the crabs were under the 5-inch minimum size limit and had to be culled from the catch. It is impossible to remove every undersize crab from the catch and some are steamed and find their way to the crab-picking tables.

The biologists are also working on a modification of the Virginia crab pot that will allow crabs less than 5 inches wide to escape but still retain those 5 inches and larger. Such a device, if successful would save hundreds of thousands of crabs each year.

York River watermen have other problems too, for they have been catching a few adult female crabs that are less than 5 inches wide. These adult females, with broad rounded abdomens (aprons), will never shed again and have reached their full sizes. Virginia seafood laws do not specify what should be done with these.

One day in July from the catch of about four watermen, the biologists found 17 females under 5 inches in width. Four were less than $4\frac{1}{4}$ inches, and five were from $4\frac{1}{2}$ to $4\frac{3}{4}$ inches wide. These were giants compared with one that was caught in 1945 which was only 2 inches wide but bearing eggs.

On the seaside of the Eastern shore, especially in Chincoteague Bay, many of the adult crabs are less than 5 inches wide. The Virginia Fisheries Laboratory hopes to determine whether the present size regulations should apply to these runts.



Wholesale Prices, July 1955

Wholesale price trends in the various fisheries were mixed from June to July. A slight change occurred in the July 1955 edible fish and shellfish (fresh, frozen, and canned) index (103.5 percent of the 1947-49 average)--only 0.2 percent lower than in June and exactly the same as the index for July 1954.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, July 1955 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1947-49 = 100)			
			July 1955	June 1955	July 1955	June 1955	May 1955	July 1954
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					103.5	103.7	98.1	103.5
Fresh & Frozen Fishery Products:					106.3	107.4	97.9	109.8
Drawn, Dressed, or Whole Finfish:					99.9	101.3	85.6	119.3
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.06	.09	57.4	87.5	57.6	119.0
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.29	.24	90.8	74.3	68.1	106.0
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.58	.58	130.3	129.2	111.8	128.4
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.33	.49	81.8	120.2	141.3	105.4
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.65	.68	131.4	136.5	146.6	119.3
Lake trout, domestic, No. 1, drawn, fresh	Chicago	lb.	.46	.53	93.2	107.6	96.3	104.5
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.69	.44	161.8	103.8	93.8	143.0
Processed, Fresh (Fish & Shellfish):					108.0	111.6	108.5	98.7
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.23	.32	78.3	107.2	85.1	74.8
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.67	.71	105.9	111.4	108.6	93.3
Oysters, shucked, standards	Norfolk	gal.	4.75	4.63	117.5	114.4	114.4	111.3
Processed, Frozen (Fish & Shellfish):					106.7	103.2	95.6	97.6
Fillets: Flounder (yellowtail), skinless, 1-lb. pkg.	Boston	lb.	.39	.39	102.1	2/102.1	99.5	100.8
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.27	.26	83.2	81.6	80.0	100.4
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.27	.27	106.7	106.7	106.7	116.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.71	.67	108.8	103.4	91.0	84.1
Canned Fishery Products:					99.2	98.3	98.3	94.2
Salmon, pink, No. 1 tall (16 oz.), 48 can/cs.	Seattle	case	20.70	20.70	109.6	109.6	109.6	99.1
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans cs.	Los Angeles	case	12.80	12.50	92.3	90.1	90.1	94.1
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	case	7.55	7.55	88.1	88.1	88.1	3/
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs.	New York	case	6.70	6.70	71.3	71.3	71.3	69.2

1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.
2/ Revised.
3/ Not available.

From June to July lower prices for large offshore haddock at Boston (down 34.4 percent) and most fresh-water varieties were somewhat offset by higher prices at New York for Western halibut (up 22 percent), yellow pike, and king salmon. Adverse weather conditions restricted fishing for halibut and salmon on the West Coast and supplies of these fish were light to moderate. The July subgroup index for drawn dressed, or whole finfish was 1.4 percent lower than the previous month and 16.3 percent below July 1954. Prices in July 1955 for haddock, halibut, whitefish at Chicago, and lake trout were all substantially lower than a year earlier.

Fresh shrimp and haddock fillet prices were lower in July than a month earlier and more than offset a slight rise in oyster prices. The index for the fresh processed fish and shellfish subgroup dropped 3.2 percent from June to July. When compared with a year earlier, the subgroup index was up 9.4 percent with all items priced higher.



Frozen shrimp and haddock fillet prices rose from June to July, while prices for frozen fillets of flounder and ocean perch did not change. The July 1955 index for frozen processed fish and shellfish was 3.4 percent higher than June and 9.3 percent higher than a year earlier. When compared with a year earlier, July 1955 prices for flounder fillets and shrimp were higher, while for fillets of haddock and ocean perch they were lower.

Higher canned tuna prices were responsible for the rise of 0.9 percent in the subgroup index for all canned fish from June to July. Canned fish prices in July 1955 were also higher (up 5.3 percent) than the same month a year earlier with salmon and Maine sardine priced higher and tuna priced lower.



TIME FOR SHOPPING

Time for Shopping, the third in a series of film studies on American food industries by a national manufacturer of frozen food packages, records the buying habits of nearly 1,000 customers shopping at frozen food cases in supermarkets in five major cities.



Every effort was made to answer the questions felt to be of the greatest interest to the frozen-food packaging industry. Who does the shopping--men or women? How much do shoppers handle the packages, study, or read them? Compare them? How many actual purchases were made? How do fish and shrimp sales compare with competing frozen foods? The results should be of interest to packers and sellers of frozen fish:

Who Does the Shopping:	Handling the Packages:
69.3% women 14.2% men 16.5% couples	The average women handled 2.23 packages. The average man handled 2.37 packages. Couples purchased an average of 3.02 packages.
Who Purchased Fish and Shrimp:	**Who Were the Buyers:**
54.9% women 25.5% men 19.6% couples 70.6% were over age 30 29.4% were under age 30	Women purchased an average of 1.70 packages. Men purchased an average of 1.69 packages. Couples purchased an average of 2.08 packages.

How Much was Purchased:

	Packages	Varieties
	No.	No.
Prepared foods	1.85	1.15
Fish	1.46	1.04
Poultry	1.38	1.13
Total Frozen Foods . .	1.76	1.22



International

TRAWLER OWNERS OF SIX EUROPEAN NATIONS MEET IN GERMANY

An international deep-sea fishing conference to discuss the founding of an international fishing association was opened in Bremerhaven, Germany, in mid-July, The Fishing News (a British fishery periodical) announced.

Representatives of deep-sea fishing associations from Belgium, Britain, France, West Germany, Holland, and Spain were present.

Themes for discussion were fishing in the North Sea, the Icelandic sovereignty claims in the waters around Iceland, the extension of fishing limits, conservation of the living resources of the sea, and the insurance of fishing vessels.

The German High Seas Fishing Association announced only that "no decisions had been taken" in the discussions, which were in private. The meeting was only of an exploratory nature.

TERRITORIAL WATERS

UNITED STATES AND SOUTH AMERICAN GOVERNMENTS MEET TO DISCUSS SOUTH PACIFIC FISHERY RESOURCES: Representatives of the Governments of Chile, Ecuador, Peru, and the United States met in Santiago, Chile, on September 14 for the purpose of holding conversations regarding the conservation of fishery resources in the waters of the South Pacific and to plan appropriate scientific and technical studies to that end, an August 23 U. S. State Department release states.

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LATIN AMERICAN COUNTRIES POSTPONE MEETING TO ESTABLISH REGULATIONS IN TERRITORIAL WATERS: The proposed tripartite conference to establish regulations for fishing in the 200-mile maritime zone claimed by Ecuador, Peru, and Chile under the Santiago Declaration has been postponed from August to an undetermined date, an August 1 U. S. Embassy dispatch from Lima points out.

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PERUVIAN REACTION TO U. N. COMMISSION RECOMMENDATIONS: The recommendations of the Geneva meeting of the United Nations Commission which tended to confirm the validity of the three-mile limit for territorial waters, as opposed to the exaggerated claim of 200-mile jurisdiction, caused a prompt reaction in Peruvian circles, a June 24 U. S. Embassy dispatch from Lima points out.

A Peruvian Foreign Office official stated in the press (La Prensa, June 22) that the decision does not in the slightest affect the international conventions by which Chile, Peru, and Ecuador have established 200-mile jurisdiction. The Foreign Office spokesman also is quoted as stating that the Peruvian position has been amply set forth in its Note to Great Britain (and to the United States) and that, so far as the recent findings of the Commission are concerned, they constitute only a recommendation to be made to the United Nations Assembly and hence cannot be binding on Peru.

The Counselor of the Chilean Embassy is quoted as stating that Chile will maintain its position regarding 200-mile jurisdiction and that the findings of the Commission are ambiguous since, while on the one hand it reaffirms the position of the three-mile limit, on the other hand it recognizes that there is no uniformity on this question. The Chilean Counselor is also quoted as stating that the United States has abandoned the principle of the three-mile limit. He adds that the three countries will stand together since the question is a dispute caused by economic interests of the fishing concerns desiring to exploit fish resources in the 200-mile zone.

The Chargé of the Ecuadoran Embassy was quoted as making observations in a similar vein.

UNITED NATIONS INTERNATIONAL LAW COMMISSION

NINE ARTICLES ON TERRITORIAL WATERS DRAFTED: The International Law Commission discussed the old dispute over the extent of territorial sea limits at its seventh session in Geneva in May and June 1955. Britain and the United States want a three-mile limit, the Scandinavian countries want at least four miles, and Yugoslavia is pressing for six miles, reports the July 8, 1955, issue of The Fishing News, a British fishery periodical. Russia in practice applies a 12-mile limit, and Chile, Peru, and Ecuador claim that their territorial waters extend 200 miles out to sea.

On June 14 the Commission adopted a provisional ruling that, without taking any decision as to the question of the proper extension of the territorial sea, it "considers that in any case, international law does not justify the extension of the territorial sea beyond 12 miles."

On June 22 the Commission adopted an article aimed at protecting the territorial waters of countries whose coastline is deeply indented, by providing that in special circumstances these waters be calculated from a straight base line between appropriate points on the coast, disregarding the low-water mark from which the boundary is usually measured. Britain, the United States, and France voted against the proposal.

A report from Geneva pointed out that the International Law Commission reached the following determination on the Breadth of Territorial Waters, subject of course to final conclusions:

"1. The Commission recognizes that international practice is not uniform as regards traditional limitation of the territorial sea to three miles.

"2. The Commission considers that international law does not justify extensions of the territorial sea beyond twelve miles.

"3. The Commission, without taking any decision as to the breadth of the territorial sea within that limit, considers that international law does not oblige the States to recognize an extension of the territorial sea beyond three miles."

At the meeting in Geneva the following recommendations were adopted (subject to final approval when the Commission completes study of all topics relating to the 'Regime of the High Seas'):

Draft of Proposed Recommendations of the International Law Commission to the United Nations General Assembly

Chapter III: Freedom of Fishing

Right to Fish

Article 28 (new)

All States have the right to claim for their nationals the right to fish on the high seas, subject to their treaty obligations and to the provisions contained in the following articles concerning conservation of the living resources of the high seas.

Conservation of the Living Resources of the High Seas

Article 29

A State whose nationals are engaged in fishing in any area of the high seas where the nationals of other States are not thus engaged, may adopt measures for regulating and controlling fishing activities in such areas for the purpose of the conservation of the living resources of the high seas.

Article 30

1. If the nationals of two or more States are engaged in fishing in any area of the high seas, these States shall, at the request of any of them, enter into negotiations in order to prescribe by agreement the measures necessary for the conservation of the living resources of the high seas.

2. If the States concerned do not reach agreement within a reasonable period of time, any of the parties may initiate the procedure contemplated in Article 35.

Article 31

1. If, subsequent to the adoption of the measures referred to in Articles 29 and 30, nationals of other States engage in fishing in the same area, the measures adopted shall be applicable to them.

2. If the State whose nationals take part in the fisheries do not accept the measures so adopted, and if no agreement can be reached within a reasonable period of time, any of the interested parties may initiate the procedure contemplated in Article 35. Subject to paragraph 2 of Article 36 the measures adopted shall remain obligatory pending the arbitral decision.

Article 32

A coastal State having a special interest in the maintenance of the productivity of the living resources in any area of the high seas contiguous to its coasts, is entitled to take part on an equal footing in any system of research and regulation in that area, even though its nationals do not carry on fishing there.

Article 33

1. A coastal State having a special interest in the maintenance of the productivity of the living resources in any area of the high seas contiguous to its coasts, may adopt unilaterally whatever measures of conservation are appropriate in the area where this interest exists, provided that negotiations with the other States concerned have not led to an agreement within a reasonable period of time.

2. The measures which the coastal State adopts under the first paragraph of this article shall be valid as to other States only if the following requirements are fulfilled:

(a) That scientific evidence shows that there is an imperative and urgent need for measures of conservation;

(b) that the measures adopted are based on appropriate scientific findings;

(c) that such measures do not discriminate against foreign fishermen.

3. If these measures are not accepted by the other States concerned, any of the parties may initiate the procedure envisaged in Article 35. Subject to paragraph 2 of Article 36, the measures contemplated shall remain obligatory pending the arbitral decision.

Article 34

1. Any State, even if its nationals are not engaged in fishing in an area of the high seas not contiguous to its coasts, but which has a special interest in the conservation of the living resources in that area, may request the State whose nationals are engaged in fishing there, to take the necessary measures of conservation.

2. If no agreement is reached within a reasonable period, such State may initiate the procedure contemplated in Article 35.

Article 35

1. The differences between States contemplated in Articles 30, 31, 33, and 34 shall, at the request of any of the parties, be settled by arbitration, unless the parties agree to seek a solution by another method of peaceful settlement.

2. The arbitration shall be entrusted to an arbitral commission, whose members shall be chosen by agreement between the parties. Failing such an agreement within a period of three months from the date of the original request, the Commission shall, at the request of any of the parties, be appointed by the Secretary-General of the United Nations in consultation with the Director-General of the Food and Agriculture Organization. In that case, the Commission shall consist of 4 or 6 qualified experts in the matter of conservation of the living resources of the sea, and one expert in international law, and any casual vacancies arising after the appointment shall equally be filled by the Secretary-General. The Commission shall settle its own procedure and shall determine how the costs and expenses shall be divided between the parties.

3. The Commission shall, in all cases, be constituted within five months from the date of the original request for settlement, and shall render its decision within a further period of three months, unless it decides to extend that time limit.

Article 36

1. In arriving at its decisions, the Arbitral Commission shall, in the case of measures not unilaterally adopted by coastal States, apply the criteria listed in Article 33, paragraph 2 according to the circumstances of each case.

2. The Commission may decide that pending its award the measures in dispute shall not be applied.

Article 37

The decisions of the Commission shall be binding on the States concerned. If the decision is

accompanied by any recommendations, they shall receive the greatest possible consideration.

Other articles recommended by the I.L.C. on questions of interest to the fishing industry on the "Regime of the High Seas" are as follows:

REGIME OF THE HIGH SEAS

Definition of the High Seas

Article 1

The term "high seas" means all parts of the sea which are not included in the territorial sea or inland waters of a State.

Freedom of the High Seas

Article 2

The high seas being open to all nations, no State may subject them to its jurisdiction. Freedom of the high seas comprises inter alia:

1. Freedom of navigation;
2. Freedom to lay submarine cables and pipelines;
3. Freedom of fishing;
4. Freedom to fly over the high seas.

Chapter I: Freedom of Navigation

Status of Ships

Article 3

Ships possess the nationality of the State in which they are registered. They shall sail under its flag and, save in the exceptional cases expressly provided for in international treaties or in the present regulations, they shall be subject to its exclusive jurisdiction on the high seas.

Right to a Flag

Article 4

Each State may fix the conditions for the registration of ships in its territory and the right to fly its flag. Nevertheless, for the purposes of recognition of its national character by other States, a ship must either:

1. Belong to the State concerned, or
2. Be more than half owned by:

   a) Nationals of, or persons legally domiciled in the territory of the State concerned and actually resident there.

   b) A partnership or "commandite" company in which the majority of the partners with personal liability are nationals of, or persons legally domiciled in the territory of the State concerned and actually resident there; or

   c) A joint stock company formed under the laws of the State concerned and having its registered office in the territory of that State.

Ships Sailing Under Two Flags

Article 5

A ship which sails under the flags of two or more States may not claim any of the nationalities in question with respect to other States and may be assimilated by them to ships without a nationality.

Note: Also see Commercial Fisheries Review, vol. 17, no. 6 (June 1955), p. 71

NORTH PACIFIC FISHERIES COMMISSION

UNITED STATES SECTION MEETS IN JUNEAU: The United States Section of the International North Pacific Fisheries Commission announced a meeting in Juneau, Alaska, with its Advisory Committee on September 6 and 7, 1955.

On the afternoon of September 7 there was an open session to which the public was invited to hear and discuss the North Pacific fishery problems under the purview of the International North Pacific Fisheries Commission.

The United States Commissioners on the International North Pacific Fisheries Commission are:

Edward W. Allen, Seattle Washington
Milton B. Brooding, San Francisco, California.
John H. Clawson, Anchorage, Alaska
John L. Farley, Washington, D.C.

INTERNATIONAL PACIFIC HALIBUT COMMISSION

AREAS 3A and 3B CLOSED AUGUST 4: The International Pacific Halibut Commission announced the closure of the first fishing season in Pacific halibut Areas 3A and 3B at 6 a.m. (P.S.T.) August 4, 1955. In a previous announcement the Commission had set July 26, 1955, as the closing date for the first season in those areas, but because of stormy weather it became evident that the catch limit of 28 million pounds for Area 3A (also determines the closing date for Area 3B which has no quota) would not be attained and the Commission extended fishing in those areas

to August 4. Pacific halibut fishing this year opened at 6 a.m. (P.S.T.) May 12, 1955.

Areas 3A and 3B this year were open to fishing for 81 days--the longest season for those areas since 1947 when fishing took place for 109 days. For the last few years the season for Pacific halibut fishing has been getting progressively shorter, but stormy weather this year prevented the attainment of the quota for Area 3A, which determines the closing date for both Areas 3A and 3B. In 1954 those two areas were open to fishing for 58 days as compared with 52 days (shortest on record) in 1953, 60 days in 1952, 56 days in 1951, 66 days in 1950, 73 days in 1949, and 72 days in 1948.

Areas 2 and 1B were closed to halibut fishing at 6 a.m. (P.S.T) June 5, 1955. Those areas were open to fishing this season for 24 days as compared with 21 days in 1954 (the shortest season on record), 24 days in 1953, 26 days in 1952, 28 days in 1951, and 32 days in 1950.

Before 1952 the closure of Area 3 meant the end of all regular halibut fishing, but that year's regulations established subdivisions of other areas to increase the production of halibut in some underfished banks, and in subsequent years additional open seasons were established for most of the areas.

This year the second season in Areas 2 and 1B opened at 6 a.m. (P.S.T.) August 14 and ended at 6 a.m. (P.S.T.) August 21. The second season in Areas 3A and 3B opened at 6 a.m. (P.S.T.) August 14 and ended at 6 a.m. (P.S.T.) August 23. The third season in Area 3B opened at 6 a.m. (P.S.T.) August 29 and ended at 6 a.m. (P.S.T.) September 21. Halibut fishing in Area 1A also closed at 6 a.m. (P.S.T.) September 21.

After August 21 Areas 2 and 1B, after August 23 Area 3A, and after September 21 Areas 3B and 1A shall be closed to halibut fishing until reopened in 1956.

Area 1A includes convention waters south of Heceta Head, Ore.; Area 1B, convention waters between Heceta Head and Willapa Bay, Wash.; Area 2, convention waters between Willapa Bay and Cape Spencer, Alaska; Area 3A, convention waters between Cape Spencer and the Shumagin Islands off the coast of Alaska; and Area 3B, convention waters west of Shumagin Islands and in Bering Sea.

NORTH PACIFIC FUR-SEAL CONFERENCE

THREE GOVERNMENTS ACCEPT INVITATIONS TO CONFERENCE: The Governments of Canada, Japan, and the Union of Soviet Socialist Republics have accepted invitations from the United States Government to attend a conference to negotiate a treaty for the conservation of the fur seals of the North Pacific Ocean. The conference will open in Washington on November 28, 1955, the Department of State announced on September 1.



From 1911 to 1941 the seal herds were protected by the fur seal treaty signed in 1911 by the United States, Great Britain, Japan, and Russia. So successful was this treaty in rehabilitating the seals that in 1941 Japan, as permitted by the treaty's provisions, terminated it on the ground that the animals had become so numerous as to harm Japanese fisheries. Since 1942 the United States and Canada have by agreement protected the Pribilof herd in the Northeastern Pacific waters. The purpose of the coming conference will be to extend multilateral protection again over all fur seals of the North Pacific.

The fur seals resort for breeding purposes to three Pacific island groups. These are the Pribilof Islands off Alaska, the Commander Islands off Siberia, and Robben Island north of Japan. For nine months of the year the seals are at sea, dispersing themselves over wide areas of the Pacific north of the latitudes of southern California and central Japan, and during this time the herds from the three rookeries intermingle to some extent. At the time of the 1911 convention they were faced with virtual extermination because of commercial sealers who hunted them on the high seas. By the terms of the 1911 treaty, pelagic sealing (hunting seals at sea) was prohibited.

As a result of the 1911 treaty and of the management program of the United States Government, the Pribilof herd has increased from about 125,000 animals in 1911 to 1,500,000 at present. During these 40-odd years more than 1,850,000 skins have been taken on the Pribilof Islands from male animals surplus to the breeding requirement of this highly polygamous species. The Government-operated fur-seal industry is administered by the U. S. Fish and Wildlife Service and is financed entirely out of receipts from the sale of sealskins.

INTER-AMERICAN TROPICAL TUNA COMMISSION

SEVENTH ANNUAL MEETING IN PANAMA: The seventh annual meeting of the Inter-American Tropical Tuna Commission opened in Panama on July 14, 1955. It was attended by commissioners from Panama, Costa Rica, and the United States. Peru, Colombia, Chile, and Nicaragua also were represented by observers, reports a U. S. Embassy dispatch (July 18) from Panama.

The Commission's Director of Investigations in his report pointed out to the meeting that "the Gulf of Panama ranks with the Gulf of California as the most important fishery for sardines used as tuna bait and there is no indication up to the present that this area is being overfished."

The United States representatives were: John L. Farley, Director, U. S. Fish and Wildlife Service; Lee F. Payne, Wilmington, Calif., newspaper publisher; and Gordon W. Sloan, Washington attorney.

TRADE AGREEMENTS

CHANGE IN TERMINATION DATE OF U. S.-ECUADOR TRADE AGREEMENT: Steps were being taken to change the termination date of the 1938 bilateral trade agreement with Ecuador from July 18, 1955, as had previously been announced, to January 18, 1956. This does not constitute a reversal of the decision to end the trade agreement, but is only a postponement, reports a June 28 State Department release.

This action will not change the present rate of import duty on canned sardines applied by Ecuador, which was established January 1, 1954, at 6 sucres per net kilogram (18 U. S. cents per pound). The trade agreement rate on canned sardines which was 0.49 sucres per legal kilogram including containers and packaging (1.5 U. S. cents per pound) under the 1938 agreement, has not been effective in recent years due to the imposition by Ecuador of exchange surcharges and increased rates of duty.

Note: See Commercial Fisheries Review, April 1955, p. 57

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UNITED STATES TARIFF CONSULTATIONS: In accordance with instructions from President Eisenhower, consultations are now going on with other countries looking towards the holding of multilateral tariff negotiations beginning in January 1956, according to an August 1 U. S. State Department release.

United States participation in such negotiations will take place pursuant to the authority in Public Law 86, the Trade Agreements Extension Act of 1955 (known as H. R. 1 before its enactment). At the appropriate time a formal notice of intention to negotiate will be issued. This notice will be accompanied by a list of products on which the United States will consider the possibility of concessions to be given in exchange for concessions to be obtained from other countries.

In accordance with the usual procedures, an announcement will also be made inviting interested persons to file written briefs and to appear at public hearings before the U. S. Tariff Commission and the Committee for Reciprocity Information (an interdepartmental committee on which nine agencies of the Government are represented). The Tariff Commission will be concerned with the determination of a "peril point" (the minimum duty necessary to avoid serious injury to the domestic industry) for each product on the list. The Committee for Reciprocity Information will receive views on any aspect of the negotiation in which any person may be interested. Requests may be presented to this Committee as to products on which concessions should be sought from the other countries negotiating with the United States.

The President has two kinds of tariff reduction authority under P. L. 86. Under one authority he may in a trade agreement reduce any rate of duty that is in excess of 50 percent ad valorem or its equivalent down to that figure. However, no more than one-third of the decrease may be put into effect in any 12-month period. Under the other authority he may reduce rates of duty by up to 5 percent of their January 1, 1955, level in each of the next three years.

These authorities may not be used cumulatively and the authority to make the first 5-percent reduction under the second alternative lapses unless used before July 1, 1956. The second 5-percent authority ceases unless used by July 1, 1957, and the third 5-percent authority ends July 1, 1958.

According to present plans, the other countries which may negotiate with the United States will include those countries which are contracting parties to the General Agreement on Tariffs and Trade. It is not expected that all such countries will negotiate either with the United States or among themselves. There will also be the opportunity for countries not now contracting parties to negotiate for the purpose of acceding to the General Agreement. In due course an announcement will be made of the countries which will negotiate with the United States.

NORTH PACIFIC OCEANOGRAPHIC SURVEY

CANADIAN-JAPANESE-UNITED STATES SURVEY COMMENCES IN AUGUST 1955: Canada, Japan, and the United States will join forces in August 1955 to conduct a summer synoptic oceanographic survey of the North Pacific Ocean from North America to Japan and from the Tropic of Cancer almost to the Bering Strait.

Plans for Operation NORPAC were announced at the 36th annual meeting of the American Geophysical Union. The results are to serve as a background for studies of fisheries problems of all three countries, and to provide data for exhaustive research in the various fields of oceanography: physical, biological, chemical, meteorological, and geological.

In terms of ships, manpower, and area covered this will be the largest oceanographic program ever conducted. In none of the previous large oceanographic cruises have the measurements been taken in a short enough time to avoid seasonal changes in the ocean currents being measured. Previous cruises covered large areas but have required more than a year to complete.

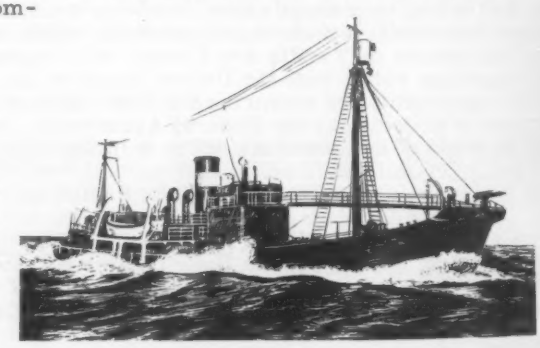
NORPAC has been over a year in the making, and is part of a plan to join the efforts of institutions engaged in oceanographic and fishery research in a large-scale long-term attempt to discover the meteorological and oceanographic causes of major fishery fluctuations in the Eastern, North, and Tropical Pacific Ocean.

Three United States agencies are involved: the California Cooperative Oceanic Fisheries Investigations, using the vessels of the Scripps Institution of Oceanography and the South Pacific Fishery Investigations of the U. S. Fish and Wildlife Service; the Department of Oceanography of the University of Washington; and the Pacific Oceanic Fishery Investigations of the U. S. Fish and Wildlife Service stationed in Hawaii. The Canadian agency is the Pacific Oceanographic Group, Nanaimo, British Columbia. The cooperating Japanese agencies are the Nagasaki Marine Observatory; the Kobe Marine Observatory; the Hakodate Marine Observatory; the Japanese Hydrographic Office; the University of Hokkaido; the Tokai Regional Fisheries Research Laboratory; the Tokyo University of Fisheries; and the Central Meteorlogical Observatory.

The U. S. Fish and Wildlife vessel Black Douglas, with three oceanographic research vessels of the Scripps Institution, will study the region between the west coast of North America and Hawaii and from the end of Baja California to Canada. The Pacific Oceanographic Group will work off the Canadian coast, and the University of Washington in the Gulf of Alaska. Pacific Oceanic Fishery Investigations will study the region north of Hawaii. The Japanese oceanographers will work principally eastward of the Japanese islands. The University of Hokkaido will send a ship to the Bering Sea, according to a June 1955 bulletin from the Pacific Science Association.

WHALING

INTERNATIONAL WHALING COMMISSION PROPOSES REDUCED ANTARCTIC CATCH LIMITS: In an effort to prevent a further reduction in the size of whale stocks, the International Whaling Commission, representing 17 nations, decided in July to set a new limit on the number of whales caught in the Antarctic, reports The Fishing News (July 29), a British fishery magazine.



After scientists had expressed grave fears that whale stocks were being seriously diminished because the reproduction rate was not keeping up with catches, the Commission voted to reduce the permitted international ceiling from 15,500 to 15,000 blue-whale units next season beginning in December, with a further reduction of 500 for the next year.

A blue-whale unit is the measurement of the quantity of oil extracted, and represents either 1 blue whale, 2 fin whales, or $2\frac{1}{2}$ humpbacked whales. The ceiling is the total permitted catch shared by the seven nations working Antarctic whale-oil refineries--Norway, Great Britain, Japan, the Soviet Union, Panama, Netherlands, and Union of South Africa--all of which were represented.

It is understood that the proposal to reduce the ceiling was opposed by several delegates. The Commission pointed out in a statement that Governments had the right to object within a 90-day period and the change would not be binding on any Government which objected.

Further changes, also subject to the right of objection by Governments, were the decision to ban the catching of blue whales before February 1 instead of February 21, and to open for three years certain closed areas in the Pacific so that whale stocks might be studied.

The Conference has also reached general agreement on a Norwegian proposal that an independent observer of another nationality should travel in whale-oil refineries to insure that there were no infringements of regulations, such as the limit set on the total of whales caught.

Australia

RETAIL PRICES FOR JAPANESE CANNED TUNA: Japanese canned tuna which wholesaled in Sydney, Australia, in April at 12s. 9d. (US$1.41) a dozen 3½-ounce cans, and 22s. 3d. (US$2.49) a dozen 7-ounce cans (fancy pack in oil), was reported by the June 1955 Fisheries Newsletter as retailing in food shops in May at the following prices as compared with prices for Australian tuna.

Product	Retail Price Per Can	
	LA	U.S.¢
Fancy Pack in Oil:		
7-oz.: Japanese (Brand A)	2s. 9½d.	32
Japanese (Brand B)	3s. 11d.	44
Australian	2s. 10½d.	33
3½ oz.: Japanese (Brand B)	2s. -	22
Australian	2s. 3½d.	26
Shredded in Oil:		
3½ oz.: Australian	2s. -	22
Fancy in Brine:		
7-oz.: Australian	2s. 7½d.	30

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WEST AUSTRALIAN TUNA SURVEY RESULTS: Recent tuna surveys have apparently confirmed previous reports on the unpredictable occurrence of commercial concentrations of tuna in West Australian waters, according to a United States consular dispatch from Perth dated June 3. The West Australia State Fisheries Department survey ship Lancelin recently returned from a cruise in Geographe Bay on the southwest coast near Cape Naturalists and reported satisfactory catches of oriental bonito and southern bluefin tuna, although sizes were small, with an average of only 10 pounds each for the southern bluefin catch. Northern bluefin and yellowfin tuna have also been caught as far south as Busselton. The survey work is continuing in the Fremantle area.

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COOKED WHOLE SPINY LOBSTERS SHIPPED TO UNITED STATES: A first shipment of 56,000 pounds of cooked whole spiny lobsters was shipped to the United States from Fremantle, Australia, early in May. The Fishermen's Cooperative in that area is trying to develop a market for this type of product on the United States west coast, points out a June 3 United States consular dispatch from Perth.

The spiny lobster fishing fleet has moved north to the Abrolhos Islands off Geraldton and reports highly satisfactory catches.

Canada

MID-WATER TRAWL EXPERIMENTS: The first phase of the mid-water trawl experiments being conducted by the Fisheries Research Board of Canada

at the Pacific Biological Station was completed during February, according to the March 1955 Progress Reports from that station. The scientist supervising the experiments has reported fairly successful preliminary results. Funds from the Industrial Development Vote were used to conduct the experiments during the five-week period aboard the chartered vessel Sea Pride II.

The net is constructed almost entirely of nylon twine and rope, and has a working gape of 35 by 35 feet. The otter boards used to hold the net open are of a novel design and are suspended quite different from the conventional gear. Both the net and boards were designed and constructed by a Vancouver fisherman who has had considerable experience in herring trawling.

The gear was found to be very effective at night and numerous catches of 10 to 35 tons of herring were made in 15- to 20-minute drags on schools of herring located entirely off the bottom, at depths from 15 to 35 fathoms. Catches in daylight were much lighter (average 1 to 2 tons) than those made during the night when drags were made on comparable concentrations of fish. However, two daylight drags on a large school located in mid-water at depths between 40 and 50 fathoms yielded 15 and 35 tons. Further tests are planned for the coming summer off the west coast of Vancouver Island. A detailed report on the gear and these preliminary experiments will appear in the near future.

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IN-PLANT TRAINING OF FRESH-FISH INSPECTORS BEGUN: In-plant training of men in fresh-fish inspection has begun in Halifax, N. S., under a Canadian Federal Department of Fisheries scheme, reports that agency's June Trade News. The training is made possible through the cooperation of the fishing industry.

Seven experienced fish inspectors have begun this new phase of training. Eventually it will be extended to other areas of the Maritimes. Initial training in fresh-fish inspection was given to 20 inspectors at classes held in Halifax last March. All will get in-plant training to supplement the earlier class and practical work.

In order to assess the work of the inspectors and to insure standardization of inspection, chemical tests will be made on samples of the fish inspected during the training. The analysis will be carried out in the Atlantic Fisheries Experimental Station of the Fisheries Research Board of Canada at Halifax.

Coupled with the training is a fact-finding mission on the part of the inspectors. They will collect information on the condition of fish landed and the storage conditions under which the fish were held in the trawlers. This information will be analyzed by the Fish Inspection Service of the Department and by the Fisheries Research Board. The results will then be made available to the industry.

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IMPROVING QUALITY OF WHITEFISH: Steps to be taken to improve the quality of whitefish were pointed out by the Canadian Department of Fisheries in a recently issued pamphlet, states the March 1955 issue of Trade News. The pamphlet is part of the Department's program to place high-quality fish products on the markets both in Canada and the United States.

It is pointed out that the immediate cooling of the fish to 32° F. is the most important single contribution a fisherman can make in maintaining the top quality of his catch. Withholding icing until later only retards bacterial growth and will not restore quality already lost.

The pamphlet points to the following factors as producing high-quality whitefish: (1) ample ice aboard boats for immediate chilling of the catch; (2) the use of clean containers and new boxes; (3) careful and thorough culling in order to remove stale, soft, defective, or drowned fish; and (4) not packing over 50 pounds of fish per box.

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BRITISH COLUMBIA HERRING FISHERY PROSPECTS, 1955/56: The eleventh in an annual series of circulars (Prospects for the 1955/56 Herring Fishing Season,

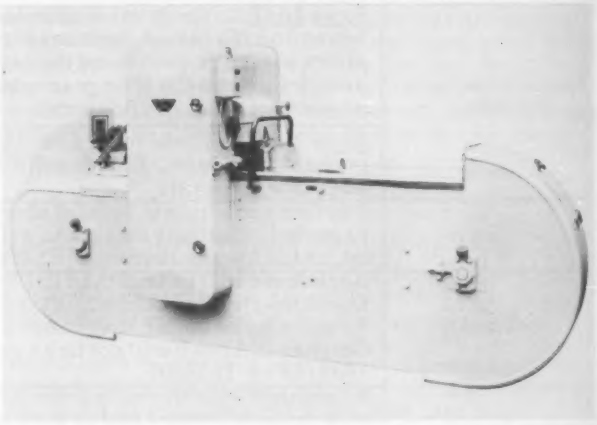
Summary Forecast of British Columbia Herring Fishery Prospects, 1955/56 Season

British Columbia Coast Subdistrict	Forecast	Relative Size of Fish
Queen Charlotte Islands	Area 2A (E). The level of abundace will be lower in 1955/56. A further increase in effort will be required and the catch will be smaller unless the 1953 year-class makes an unexpectedly strong entry.	On the average larger than in 1954/55.
	Area 2B (E). The level of abundance will probably be lower. Data insufficient for adequate forecast.	Larger than in 1954/55.
Northern	Further reduction in level of abundance expected. Unlikely that quota will be reached, catch may be less than in 1954/55.	Larger than in 1954/55.
Central	Abundance will be less than in 1954/55. Quota may not be reached. Fishing in Area 6 may be better than in Area 7. Catches in Area 9 will not be as good as in 1953/54 or 1954/55.	Larger than in 1954/55.
Upper East Coast	Abundance will decrease from the high level of the past 3 years and as good catches cannot be expected. With normal effort $\frac{1}{2}$ to $\frac{3}{4}$ of the quota may be taken.	Smaller than in 1954/55.
Middle East Coast	Abundance expected to remain at a high level. Summer fishery prospects as good as in previous years. Provided summer fishery takes less than 10,000 tons, an additional 10,000 tons could be taken in the winter fishery in Area 13. Further quota extensions should depend on apparent abundance of fish on the grounds during the 1955/56 season.	Slightly larger than in 1954/55.
Lower East Coast	Abundance may be lower than in 1954/55, but the quota should be taken as readily as in previous years. Quota extension may be warrented if apparent abundance of fish on grounds at end of regular fishery is high.	About the same as in 1954/55.
West Coast	Areas 23 and 24. Some increase in level of abundance can be expected in 1955/56. Catches should be better than in 1954/55, although they may still be somewhat below average.	About the same as in 1954/55.
	Areas 25 and 26. A continuation of the poor fishery is expected with a possibility of a slight increase over 1954/55. Fishing will not be as good as in Areas 23 and 24.	About the same as in 1954/55.
	Area 27. Abundance in 1955/56 not expected to be as high as in 1954/55 and fishing will not be as good.	Smaller than in 1954/55.

Circular No. 38), dealing with the prospects of the British Columbia herring fishery, was issued by the Pacific Biological Station of the Fisheries Research Board of Canada at Nanaimo, B. C. Various studies of the herring populations form the basis of these annual predictions. In the table a summary of the forecast is given by subdistricts (the coast of British Columbia is divided into subdistricts).

Denmark

NEW FILLETING MACHINE: Two sizes of a new type of filleting machine for filleting deheaded and gutted cod and other fish of similar anatomical structure was recently placed on the market by a Copenhagen (Denmark) firm. According to the manufacturer, only one person is required to operate the machine. No sorting of fish is required within the size ranges indicated for the particular size of machine used, and it makes no difference whether the fish is in rigor mortis or soft. Fillets are cut cleanly from the backbone of the fish, even in the angle between the backbone and belly bones. A stepless variator makes it possible to adjust the speed of the machine without stopping.



Danish machine which will fillet deheaded and gutted cod and other similar fish.

The small-size machine handles deheaded and gutted fish approximately 1.1 to 7.7 pounds; fillets 12 to 20 fish per minute; measures 12 ft. 5 in. long, 3 ft. 4 in. wide, and 5 ft. 11 in. high; has a gross weight of approximately 3,400 pounds; and is powered by a 3 hp. motor. The large-size machine handles deheaded and gutted fish approximately 6.8 to 15 pounds; fillets 12 to 15 fish per minute; measures 15 ft. 9 in. long, 3 ft. 7 in. wide, and 6 ft. 7 in. high; has a gross weight of approximately 4,600 pounds; and is powered by a 5 hp. motor.

The cleaned and deheaded fish is placed on "saddles." A chain-link conveyor introduces the saddles with the fish between a pair of guides leading to the rotating cutters. The cutters automatically cut out the fillets close to the backbone. The fillets are then cut free by two fixed knives and drop down on belt conveyors on each side of the machine. The carcass or waste is collected behind the machine in a box or may be removed by means of a third conveyor belt. All sizes of fish between the weight indicated for the particular size of machine used can be filleted without adjustment.

During operation, the cutters are cleaned by a pressure spray of fresh water. The rotating cutters are shielded and equipped with a safety bar in front of the cutters. A light pressure on the safety bar breaks the current to the motor and stops the machine. The machine is driven by one electric motor situated at the top of the machine and controlled by a push-button panel at the feeding table.

French Morocco

FISHERIES TRENDS, JAN.-MAR. 1955: The French Moroccan fish canning and byproducts industries were in an unfavorable situation early in 1955 due to the poor catch in 1954, reports a June 17 United States consular dispatch from Casablanca. The 1954 pack of the canners declined to 1.2 million cases while the production of the byproduct industries was reduced by almost 50 percent.

The distress created within the industry by the absence of sufficient supplies of sardines to satisfy export possibilities was shared by the vessel owners, whose financial difficulties were increased. The seriousness of the situation was illustrated by the fact that the total 1954 sardine catch was 76,000 metric tons, compared to 103,000 tons in 1953. Owing to the inability of French Moroccan canners and byproduct producers to fill all orders from foreign markets, the Portuguese canners, profiting from exceptional catches, were able to satisfy a higher percentage of world demand for canned sardines, while fish-meal manufacturers in South Africa, Angola, and elsewhere were similarly favored.

In January the Director of Commerce visited the southern ports of Mogador, Safi, and Agadir primarily to study the situation of the industrial-fishing fleet owners with a view to framing measures to permit them to meet the obligations of their present indebtedness while making necessary expenditures to prepare the boats for the current fishing season. The formula of governmental loans for the industrial-fleet owners was retained and a Protectorate Fund of Solidarity and Guarantee established in March which would provide funds to guarantee loans extended by private credit agencies to owners whose collateral has been judged sufficient by a special commission established in each port. This central fund will be derived from the proceeds from a special tax on fish catches.

In addition to the central Fund of Solidarity and Guarantee, it was decided that equalization funds will be established in each of the ports of Safi, Agadir, and Mogador, which will also be derived from a special tax on fishing boat owners to compensate them when catches, although of canning quality, must nevertheless be sold to byproduct industries owing to a lack of demand by canners.

The controlled price of sardines for canning in 1955 will be 22 francs per kilo (2.9 U. S. cents per pound) in Safi, Agadir, and Mogador, compared to 17 and 19 francs (2.2 and 2.5 U. S. cents per pound) at the beginning of last season, while the price will be free in other ports of the Atlantic coastline. To aid in constituting the funds described above, the total of taxes (including taxes for nets) imposed on the sale of sardines to canners will be 7 francs per kilo (0.9 U.S. cents per pound) in Safi, Agadir, and Mogador, compared to 3.5 francs (0.5 U. S. cents per pound) at the beginning of last season, while in other ports the taxes will total 5 francs (0.6 U. S. cents per pound). Sardines destined for the byproducts industries will be subject to a controlled price of 5.5 francs per kilo (0.7 U. S. cents per pound) in the three southern ports and uncontrolled in price in northern ports. The total taxes on such fish will remain at 1.5 francs per kilo (0.2 U. S. cents per pound). Despite these aid measures, the situation of the industrial-fishing fleet is not bright, nor is that of the canning factories which, grouped in 25 associations, awaited the results of a season which began late and without great promise.

Exports of canned fish from French Morocco during January-March 1955 totaled more than 6,000 metric tons, about the same as the preceding quarter. Stocks of canned fish were low owing to poor fishing and canning conditions in 1954.

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SARDINE CANNING INDUSTRY, 1954: Total production of French Moroccan canned sardines in 1954 amounted to about 1.2 million cases as compared to 1.4

million cases in 1953, a May 25 U. S. consular dispatch from Casablanca points out. The catch of sardines was poor, the quality was mediocre, and the vessel owners had financial difficulties. All these factors contributed to the drop in the pack.

The light catch of sardines in 1954 also caused a decline of almost 50 percent in the production of fishery byproducts.

These decreases in the production of canned sardines and of byproducts occurred at a time when foreign market prospects for these items were encouraging.

There was a serious decline in French Morocco's exports of canned fish--32,000 metric tons were reported in 1954 as compared to nearly 45,000 tons the previous year.



Iran

FISH CANNERY PACKS SARDINES AND TUNA: A reactivated fish cannery at Bander Abbas, Iran, as of May 12, 1955, had packed 507,416 cans of sardines and 12,966 cans of tuna, according to a Foreign Operations Administration report from Tehran.



Jamaica

SHRIMP BEDS FOUND: Rich banks of ocean shrimp have been discovered off the coast of Jamaica by an exploration sponsored by the Industrial Development Corporation, states The Fishing News (July 8, 1955), a British fishery periodical. On two banks off the South Coast, near the port of Savanna-la-Mar, a United States shrimp expert reported this find of pink shrimp which it is hoped will develop into a lucrative dollar-earner for Jamaica.

The United States expert is exploring the sea area south of the Island for shrimp fishing grounds of the type which have made the Campeche Banks off Mexico's east coast world famous.

His search is the result of a report made on the commercial possibilities of Jamaica's fishing industry by another United States expert brought to Kingston last year by the Industrial Development Corporation. As a result of the report, the Corporation is already engaged in the development of an export industry in spiny lobster tails. Regular consignments of this shellfish are now being flown to the United States.



Japan

FROZEN ALBACORE TUNA SUPPLIES LOW: Only 1,000 to 1,500 metric tons of frozen albacore tuna were on hand in Japan late in June, according to the Japanese Frozen Albacore Cooperative Sales Association. Most of this was being withheld from the market in anticipation of a higher price later. A total of 400 tons was reportedly offered for sale on June 27 at US$285 per ton, US$15 above the current Japanese check price. If this deal is closed, the stocks on hand will fall below 1,000 tons, with little prospect of replenishment during the next few months.

Recent landings of albacore tuna at Japanese ports have been smaller than expected, and quality is said to have been below export standards in many cases. The future seems almost certain to bring higher prices along with reduced supply, a July 1 United States Embassy dispatch from Tokyo points out.

Japanese export licenses for frozen tuna to the United States during June totaled 7,927 metric tons (albacore, 5,338; yellowfin, 2,579; skipjack, 10), a July 8 U.S. Embassy dispatch from Tokyo reports. The Frozen Albacore Cooperative Sales Association, which was organized on June 1 to handle all export sales of albacore, reports that as of July 4 its sales had reached 8,632 metric tons--this higher figure will show up in statistics in the future as licenses are applied for to export the fish on which deals have been closed. Also as of July 4 the Association had bids on hand (at $285 per metric ton) for 500 tons, and had offered an additional 300 tons to other buyers, out of a stock-on-hand of only 1,000 tons. The trade press reports that the Association may soon raise the price to $300 per ton, and that scarcity of new landings of albacore has turned the situation from a glut to a sellers' market. At the present rate of landings, which are not expected to increase, it seems doubtful that Japan will be able to sell more than 11,000 tons of frozen albacore to the United States during the June-July period, compared with the 15,000-ton (originally 20,000-ton) "limitation" put into effect on June 1.

In the meantime a great deal of the tuna which was kept off the export market by the high check price during March, April, and May was canned. The Tokyo Tuna Sales Company, which controls all exports of canned tuna had 600,000 cases on hand as of March 31, and planned production of an additional 800,000 cases during the year ending March 31, 1956, making a total available for export to the United States of 1,400,000 cases. By July 2, however, the company had already received for warehousing 644,600 cases, of which approximately 440,000 cases are white meat (albacore) and 200,000 cases light meat (other tuna). More than 75 percent of the year's goal has been achieved during the first three months, and it may be that the goal will have to be revised upward later in the year. This emphasizes the fact that frozen and canned tuna must be considered as part of the same problem, as frozen tuna which is prevented from going directly to the United States market will eventually be canned.

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FROZEN ALBACORE TUNA EXPORT ALLOCATION FOR AUGUST-NOVEMBER 1955: The Japanese Cooperative Sales Association on July 19 set the allocation for sales of frozen albacore tuna to the United States for the period August 1-November 30, 1955, at 5,000 metric tons. Sales of albacore tuna to the United States from June 1 to July 19 totaled 10,300 metric tons with 2,000 tons still on hand. It was unlikely that sales by the end of July would total more than 11,000 tons out of the 15,000-ton "limitation" originally set in June. Unsold balance of this "limitation" will not be carried over in addition to new 5,000-ton allocation for August-November. This makes the probable total maximum sales from June 1-November 30 approximately 16,000 tons as compared with 16,005 tons approved for export by the Ministry of International Trade and Industry during the same period in 1954, a July 21 U. S. Embassy dispatch from Tokyo reports.

Orders for frozen Japanese albacore tuna from the United States fell off during mid-July, presumably because of the beginning of the United States albacore fishing season. The Cooperative Sales Association was holding present stocks in anticipation of future sales at US$285 or higher, with larger dealers reported ready to purchase frozen albacore at US$275 from financially-distressed dealers to prevent sacrifice sales.

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LOWER FROZEN TUNA CHECK PRICES RECOMMENDED: The Japan Frozen Food Export Association has requested that the Ministry of International Trade and Industry reduce check prices on frozen tuna in line with the US$40-per-ton reduction reported as accepted by the United States tuna fleet. The recommended reduction of check prices is as follows: Yellowfin (under 80 pounds) from US$235 to US$195; Yellowfin (over 80 pounds) from US$215 to US$175; Skipjack from US$195 to US$155.

No action was recommended on albacore tuna at this time, since no frozen albacore remains on hand for sale, but it is possible that an equivalent reduction in the albacore price would be requested this fall when the winter catch begins, reports an August 17 U. S. Embassy dispatch from Tokyo.

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TUNA INDUSTRY UNITES: Representatives of all segments of the Japanese tuna industry met on July 12 and agreed to revive the "Council on Tuna Exports" (Maguro Kyogikai) in order to present a united front in dealings with the United States, reports a July 15 U. S. Embassy dispatch from Tokyo.

The Council, which includes representatives of the Japanese fishing interests, canners, frozen fish dealers, canned and frozen fish exporters, and others concerned with the tuna industry, was first organized in 1950. Its aim was to present a unified agency for dealing with demands in the United States for tariff increases on tuna, and functioned until about 1953 when it largely lost its united character as the interests of the canners and freezers began to diverge.

The recent outcries in the United States against the concessions granted on tuna in the GATT negotiations and the demands for restrictions on imports of both canned and frozen tuna have apparently convinced the various branches of the Japanese tuna industry that their mutual interests in preserving access to the United States market are more important than their business differences. It is expected that the new Council with the unofficial assistance and advice of the Japanese Government Fisheries Agency will become a dominant factor in Japanese tuna exports.

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TUNA INDUSTRY POINTS OUT STEPS TAKEN TO PREVENT DAMAGE TO U. S. TUNA INDUSTRY: The Japan Frozen Food Exporters Association and the Japan Export Frozen Products Manufacturers Association are understood to have presented a petition to the Director of the Economic Planning Board and the Ministers of Foreign Affairs, International Trade and Industry, and Agriculture and Forestry, an August 3 United States Embassy dispatch from Tokyo asserts. The petition lists the steps taken in Japan to prevent the Japanese exports of frozen tuna damaging or disrupting the United States tuna industry. The steps indicated in the petition are:

MAINTENANCE OF EXPORT PRICE: Government check prices (f.o.b.) are established on exports of frozen tuna to the United States. These check prices are floor prices. They are calculated to approximately equalize the average ex-vessel prices of tuna in the United States after adding freight and other handling charges to the f.o.b. price Japan. Maintenance of sales at or above the Government check price is under the surveillance of the Frozen Albacore Export Agency. This Agency was organized June 1, 1955. Its members include all exporters of frozen tuna in Japan. All transactions in the trade of frozen tuna with the United States are checked and coordinated by this Agency.

QUANTITY OF EXPORTS: Several thousand tons of frozen albacore tuna have been sold to the United States in April and May of the current summer season which began early (April). Shipments (exports) of frozen albacore during the current summer will be regulated on the basis of an allocation (to exporters) of 15,000 metric tons for the period beginning June. Total landings of albacore by the United States fleet ranges from 16,000 to 20,000 tons annually. This catch is considerably below the requirements of albacore of the United States tuna packers. The Japanese albacore supplements the United States catch and thus contributes to the maintenance of the United States pack of white meat tuna for the United States market. Under this condition, the Japanese frozen albacore does not constitute a menance to the United States tuna industry.

Japanese frozen yellowfin tuna is being shipped to the United States in regular monthly amounts which range from 1,000 to 2,000 tons. Actual export records for 1954 support this statement. The United States packer can anticipate a constant supply and in regular monthly moderate amounts. This stability of the rate of imports of yellowfin should cause no sudden or major disturbance affecting the supply of the American fishermen. Exports of yellowfin from Japan are not likely to increase substantially in 1955 because (a) Japanese mothership fleet operations are at a much reduced scale (compared to 1954), and (b) much of the catch of the Japanese long-range catchers goes to the domestic market where quality fish bring higher prices than for export.

Quality of exports of frozen tuna to the United States in 1955 will be subject to the limiting factors stated above. It is anticipated no serious disturbance to the American tuna fishermen will be created directly from these exports of frozen tuna from Japan.

RESTRICTIONS ON JAPANESE TUNA FLEET: On July 9, 1955, a temporary exception to the Japan Fishery Law expired. This exception permitted new and additional construction of tuna boats. (It was part of a program to relieve the economic pressure on the inshore fisheries by development of the offshore and distant fisheries.) With the expiration of the exception (on July 9), no licenses will be issued for new (additional) construction of fishing boats above 100 gross tons. The Japan Fishery Law (Article 5) states that neither the number nor gross tonnage of the fleet will be increased. With the Japanese tuna fleet limited to its present size, no marked increases in catch will result by any increase in number of boats. This limit on the size of fleet will contribute to stabilizing quantities and f.o.b. price of frozen tuna for export.

As indicated by the above enumerated points, Japanese frozen tuna exports are subject to regulation on exports by check prices, allocations to exporters, and restrictions on construction of fishing boats.

Market conditions for the sale of canned tuna in the United States during the last year or so has been affected by the decline of prices on foodstuffs in general. Prices of canned tuna were relatively high and out of line with this downward trend of general food prices in the United States. Consumer prices of canned tuna had to be reduced especially to follow the decline in price of the competitive meats and poultry. It is believed the United States market is stabilizing at a new level and that inventories will decrease and adjust to normal conditions in the near future. Any restriction of the importation of frozen tuna now would create confusion and might upset the trend toward a more normal condition within the United States tuna industry.

Total exports from Japan to the United States are only one-third of the imports into Japan from the United States. The trade balance is most unfavorable to Japan. Restriction on the export of frozen tuna would be to the mutual disadvantage of Japan and the United States. Exports of tuna are one of the more important items contributing to a more favorable adjustment of this export balance.

The frozen tuna interests of Japan desire to cooperate with the United States tuna industry toward a better understanding of topics of mutual interest in the development of trade in frozen tuna. The frozen tuna industry of Japan wishes that this representation of its attitude be conveyed through proper channels to the United States tuna industry.

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FROZEN TUNA FOR EXPORT TO BE LABELED WITH PLASTIC RIBBONS: The Japanese frozen tuna export industry plans to use colored plastic ribbons to mark the destination of frozen fish, a representative of the Japan Frozen Food Export Association announced. At present shipments of frozen tuna destined for different canneries in the United States may all be carried in the same hold of the ship, separated only by a net. During the voyage, or during loading and unloading, the nets sometime become tangled and the fish are moved about and the identity of shipments is destroyed. As may readily be seen, this creates problems when the fish are unloaded, since there is no way to tell which fish belong to which buyer, a July 10 U. S. Embassy dispatch from Tokyo reports.

The new plan is to attach a plastic ribbon to the tail of the fish at the time of shipment, color coded according to the buyer at the point of unloading. The Association is convinced that this plastic ribbon would not in any way harm the fish, and has received an opinion to that effect from the Japanese Ministry of Welfare. Due to concern lest the stringent application of the U. S. Pure Food and Drug Act or other United States laws adversely affect the importation into the United States of frozen fish with plastic ribbons on their tails, the Association has arranged to submit samples of the ribbons for an official statement as to whether the ribbons would in any way interfere with the importation into the United States.

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HIGH-SEAS SALMON CATCH FOR 1955 SEASON: The Japanese high-seas salmon fleets (14 motherships, each with about 25 catcher boats) caught 57,758,291 salmon as of August 5, the Japanese Fisheries Agency reports. The catch by species was (number of fish): sockeye 11,328,733; chum 20,409,480; pink 24,544,329; coho 1,430,662; spring 35,087.

Last year's catch by the Japanese high-seas salmon fleets totaled 20,493,645 salmon (all species). This season the Japanese estimated that 47,590,000 fish would be caught, but the total to date has exceeded that estimate. The fleets plan to cease operations between August 20-31. Japan's prewar record salmon catch was in 1939 when 220 million salmon were caught.

Although reports state that the rate of catch is decreasing, the latest estimate indicates that the salmon catch by the high-seas salmon fleets will exceed 60 million fish, an August 12 United States Embassy dispatch from Tokyo points out.

Japanese Fisheries Agency officials state that canners will pack 1.7 million standard cases (96 ½-lb. cans) of salmon this year. Last year only 626,000 cases were packed, of which only 380,000 cases were exported.

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JAPANESE HOPE TO SELL BRITISH MORE CANNED SALMON: Japanese salmon packers are hoping to increase sales to the United Kingdom to 700,000 cases from last year's 220,000 cases as the result of the current Japan-United Kingdom payments agreement negotiations, a July 15 U. S. Embassy dispatch from Tokyo points out. While the Japanese have been favoring a lower level of trade than that proposed by the British, early in July the Japanese Minister of International Trade and Industry and Minister of Agriculture both stated that it might be necessary to agree to a higher level of imports of British products in order to get the British to buy as much canned fish and fruit as Japan wants to sell. While pointing out that the British want Japan to increase imports of Scotch whiskey, which competes with a local product, the salmon canners feel that it would be worth it if they can increase their business.



Mexico

CHANGES IN SHRIMP FISHING SEASONS: Two changes have been made in the shrimp fishing seasons on the west coast of Mexico (Diario Oficial, August 11, 1955). The August and September closed season for fishing shrimp at sea along the coasts of Baja California, Sonora, Sinaloa, and Nayarit has been removed and trawl fishing is being allowed to continue. The new closed season will be March 16 to April 15 with a possible extension to May 15 depending upon shrimp-spawning intensity, a U. S. Fish and Wildlife Service representative in Mexico reports.

Another change in regulations permits estuarine fishing for shrimp to begin on August 16 in southern Sonora between Paredon Colorado and Agiabampo Bays, providing that 80 percent of the shrimp have reached at least 12.5 cm. total length. This second change in regulations is on an experimental basis for the current season only. Normally the estuarine shrimp season along the West Coast from Baja California through Nayarit begins on September 1 and lasts until April 15. This has not been changed other than the possible 15-day extension for southern Sonora.

There are no closed seasons for taking shrimp on the east coast of Mexico nor for the shrimp grounds between Salina Cruz, Oaxaca, and the Guatemalan border.

It is difficult to predict what effect these changes will have on the shrimp production. It is probable that the catch of 31-35 count (heads off) and smaller sizes of shrimp will be a little greater this year. However, it is not anticipated that there will be much change since the young shrimp do not begin to leave the estuaries for the ocean in large quantities until October.

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MERIDA FISHERIES TRENDS, APRIL-JUNE 1955: Shrimp: As usual all of the frozen shrimp exports from the Merida district of Mexico originated in Ciudad del Carmen and Campeche, and all went to buyers in the United States. The production of 3.5 million pounds of shrimp in April-June 1955 was 23 percent more than the 2.9 million pounds produced in January-March 1955 and 50 percent more than the production during the second quarter of 1954.

Ex-vessel prices for 15-20 count heads-off shrimp for April, May, and June 1955 were 59¢, 61¢, and 63¢ a pound, respectively, f.o.b. Brownsville, Tex. During the first three months of the year prices were 55¢, 59¢, and 58¢ a pound, respectively; in the second quarter of 1954 prices were 38¢, 42¢, and 35¢ a pound.

Merida District (Ciudad del Carmen and Campeche) Shrimp Exports by Quarters

Quarter	1955	1954	1953 1/
	(1,000 Lbs.)		
1st	2,889	2,388	2,130
2nd	3,549	2,355	2,021
3rd	-	3,344	2,610
4th	-	4,235	2,897
Total	-	12,322	9,658

1/ Include only Ciudad del Carmen exports.

Merida District Shark Fin Exports By Quarters

Quarter	1955	1954	1953
	(1,000 Lbs.)		
1st	3.7	2.3	1.8
2nd	5.0	2.2	2.5
3rd	-	5.2	4.4
4th	-	1.5	0.7
Total	-	11.2	9.4

Shark Fins: All of the shark fins exported in April-June 1955 (5,000 pounds--about 35 percent more than the 3,700 pounds exported the preceding three months) went to buyers in the United States. Exports of shark fins were higher than in any previous quarter except the third quarter of 1954 when they reached 5,200 pounds.

Shark Skins: Shark skins, which first appeared in the exports for the first quarter of 1955 when 1,300 pounds left Yucatan, increased 13 times to a total of 17,100 pounds. All went to the United States. Prior to 1950 shark skins were exported, but for five years high export duties made the business unprofitable. With the repeal of the Mexican export tariff, it is expected that about 56,000 pounds a year may be sold on the foreign market.



New Hebrides

JAPANESE WILL SUPPLY TUNA FOR NEW CANNERY: A tuna fishing company which will go into operation in New Hebrides in 1956 will make use of Japanese fishing skill, reports the April 1955 Pacific Islands Monthly. It is a British-registered company which has the financial backing of a number of planters and businessmen.

A refrigeration plant with a capacity of 2,000 metric tons of fish is promised at Santo, where the cannery will be located. However, only 700 tons of this space will be available for holding fish. The balance of the refrigeration plant's capacity will be for ice manufacturing and storage for fishing-fleet supplies. Seven 100-ton tuna clippers are reported on order in Japanese shipyards. They will be owned by the company, registered in Vila, and manned by skilled Japanese with mostly European and native crews. The skilled Japanese will consist of 137 fishermen, 18 refrigeration specialists, 12 fish-curing specialists, and 4 administrative employees to handle payments and supplying the fleet.

The company expects to begin active fishing in January 1956. The market for the frozen tuna presumably is the United States. A company spokesman stated that most of the fish sold will be paid for in dollars.

The New Hebrides company is reported discussing an agreement with the American Samoa tuna cannery. Some of the New Hebrides tuna will go to Pago Pago, American Samoa, for canning during slack periods at that cannery, some will be shipped frozen to the United States, some to Italy and France, and some dried for export to Japan. The greatest difference between the American Samoa operation and the New Hebrides operation will be that the latter's fishing vessels will not be

equipped with freezing facilities. The tuna will be chilled in ice in order that some of the tuna may be disposed of in its fresh state. In addition, since there is at present no regular supply of fresh fish in the area, the Santo enterprise is expected to provide large quantities of fish other than tuna for plantation labor.

About 3,000 tons of tuna a year must be handled to make the operation successful, according to the company. The Japanese have indicated that they will be able to catch and deliver this amount of tuna.

The Japanese fishermen will deliver fish to the Santo freezer on a contract basis, at so much per ton, the price varying with the type of fish delivered. The Japanese will find their own bait--about 60 tons of frozen bait will be imported from Japan each year. Long lines will be used to catch the tuna.

The principal season for tuna fishing will be during the southern winter. It is hoped that during the tuna off-season, local spiny lobster tails will be processed.



Norway

TUNA CANNER REPORTS STRONG COMPETITION FROM JAPAN: A small Norwegian canner of tuna in Western Norway reports strong competition from Japan where both the raw material and operating costs are much cheaper. A special price for Norwegian tuna for canning goes into effect only after the catch has reached a certain amount. This quantity was not taken last year and the prospects do not appear favorable this season. In order to keep operating, small salmon mostly from northern Norway have been canned for the British market. While this canned salmon cannot compete with Pacific salmon from the United States on the basis of price, there are buyers who, for various reasons, prefer the Norwegian salmon, according to the August 10 issue of Fiskaren, a Norwegian trade periodical.

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NEW CONTROLS ON FISHERY PRODUCTS EXPORTS: A provisional law on Norwegian export of fish and fish products which establishes more far-reaching controls on marketing and pricing was passed by the Norwegian Storting. The powerful Norwegian Fishermen's Association is not entirely satisfied with the law but has decided to go along with it, recommending that it apply for one year only. During this time the Association hopes that a recently-formed committee set up to study the feasibility of a government export agency to regulate all export prices will be able to make concrete suggestions which may alter the present provisional law, a July 1 U. S. Embassy dispatch from Oslo reports.

The Government's policy in relation to export of fish has been debated at considerable length in the last few months. The fishermen's organizations are dissatisfied with the controlled prices which they get, while exporters feel that the growing centralization and government price-setting on exported fish deprives them of their freedom of action in competing in international markets with other producing countries. Of particular interest in this connection has been the recent Icelandic increase in exports of dried fish which are underselling the Norwegian product on several markets. Exporters blame the export tax of 0.90 krone per kilo (0.6 U. S. cent per pound) for the declining sales of dried fish abroad and the fact that about 1,500 metric tons of dried fish from 1954 have not yet been sold.

The over-all fisheries policy of the Norwegian Government will undoubtedly come up for further debate in the Storting session in the fall. If the export of dried fish continues to decline, changes in the present export tax on fish and fish products may well be adopted.

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COD CATCH AHEAD OF LAST YEAR: Despite the disappointing result of this past winter's Lofoten fisheries (less than 45,000 metric tons), Norway's total cod catch is far ahead of last year's, the Norwegian Information Service announced on June 23. The large landings made along the Finnmark coast were principally responsible.



Capelin (Mallotus villosus)

Meanwhile, the transport Steinhofd arrived in Aalesund with a cargo of some 1,600 tons of salted cod caught off Greenland, where the season looks very promising.

So far, the Finnmark fisheries have produced well over 50,000 tons of cod, in addition to substantial quantities of other fish, compared with but 17,000 tons at the same time in 1954. This brings the total cod landings to 118,530 tons, as against 77,622 by mid-June a year ago. When the Finnmark fisheries are finished, this year's cod catch is expected to have reached 120,000 tons.

The Finnmark fishermen were in a frenzy of activity catching capelin, a 5-7-inch long smelt-like fish called "lodde" in Norwegian. For generations used only as bait for cod, the "lodde" has recently found increasing application as raw material for the regional fish-meal reduction plants. Every year about this time huge quantities of capeline come to spawn in the Varangerfjord. After accomplishing their mission, they fan out along the Finnmark coast, all the way east to Vadso.

The Greenland fisheries, which now rank as Norway's third important source of cod, were pioneered by enterprising fishermen from the Sunnmore district in the early 1920's. This year, over 70 Norwegian fishing vessels, including 4 large trawlers, crossed the North Atlantic to get their share of the cod stock on the banks off western Greenland. By the end of the April-September season, they will probably have landed some 17,000 tons of cod, in addition to about 500 tons of halibut. All of the cod is salted and brought back to Norway in special transports for export to Mediterranean countries, while the halibut is frozen and shipped to England.

DEVELOPMENTS IN THE GREENLAND FISHERIES: In the early days of the Greenland fisheries, Norwegian expeditions operated independently. Every full load of salted cod had to be brought back to Sunnmore. As the North Atlantic crossing took anywhere from one to two weeks each way, the fishing vessels could make only a few trips a season. In 1947, however, a number of fishing vessel operators and skippers in Aalesund formed their own provisioning and transport company. Initially, some 30 vessels joined the new organization, and several ships were chartered for the transport between Norway and Greenland. The following year the new firm joined forces with the Danish company. Then a year ago, the cooperative venture was extended to include the Faroes company. The new combine started with a capital of Kr. 2 million (US$280,000). Meanwhile, the land station established at Faeringer Harbor had been moved to nearby Asgriko Harbor, in order to provide deep-water docking facilities.

At Asgriko Harbor there is now a 600-foot long pier, with an area of 45,000 square feet; two freezing plants with a daily capacity of 25 tons each; storage for nearly 1,000 tons of deep-frozen fish; a 6,000-ton salt silo; and miscellaneous warehouses. This year the new combine is building a new 2,700-foot pier and another salt silo. Additional facilities include a machine shop, a ship supply store, a large laundry, dormitories, and a 300-seat community center with restaurant and reading room. All of this has been built in the past five years. So far, a total of Kr. 7 million (US$980,000) has been invested in developing the land station.

As a result of these cooperative efforts, which are strictly a private enterprise, the whole character of the Greenland fisheries has been changed. Fish caught on the offshore banks is delivered to Asgriko Harbor, where it is salted or deep frozen, and then loaded on transports to be carried directly to ports in Norway, principally Aalesund, and other countries. At season's end, however, the fishing vessels usually return with a full load of salted cod, as the price paid in Norwegian ports is somewhat higher than in Greenland.

Cod was rarely found in Greenland waters around the turn of the century. Now, the cod stock on the banks off western Greenland is considered among the largest in the world. Oceanographers believe this development is linked with the steady increase in the temperature of the North Atlantic. They have established that the cod is now spawning in the Greenland fjords and on the banks in the Davis Strait, instead of spawning along the Iceland coast as in former years. Apparently, codlings and young cod are able to find sufficient food in the West Greenland waters.

Meanwhile, the Norwegian ocean research vessel G. O. Sars is gearing for its third cruise of the year to the Barents Sea, northeast of Norway. Here a team of scientists under the direction of Gunnar Saetersdal will continue investigations of the conditions and migration of the Arctic cod. Another trip is scheduled for next October.

The Barents Sea is the feeding ground of the codlings spawned on the Lofoten banks off North Norway. After 5-6 years, the young Barents Sea cod is lured to the Finnmark coast by the large shoals of capelin. Some three years later, the mature cod migrate to the Lofoten spawning banks and then back to the Barents Sea. Much needs yet to be ascertained about the Arctic cod, Mr. Saetersdal admits, but the size of the yearly classes can now be predicted with considerable certainty. However, the causes of the big fluctuations in the annual Lofoten cod stock are still beyond the ken of ocean researchers, he says.

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BRISLING SARDINE CATCH POOR: The Norwegian brisling sardine catch this season up to July 7 totaled approximately 69.2 million pounds, only about one-half the catch for the same period a year earlier, reports a July 22 U. S. Embassy dispatch from Oslo. The 1955 catch has been the poorest in years. If it does not improve within the remaining two months of the season it will cause serious consequences in the Norwegian canning industry. In fishing circles it has been recently maintained that the poor catch is due to increased fishing in the Skaggerak, the brisling breeding grounds.

Canned brisling sardine is an important dollar-earning item for Norway. A poor brisling sardine catch would especially affect Norwegian ability to meet demand in the United States where an extensive advertising campaign has been under way since 1952 to increase sales of Norwegian canned brisling sardines.

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MACKEREL FILLETS FROZEN IN ALGINATE JELLY: Full-scale production of deep-frozen mackerel fillets in alginate jelly has been started by Norges Makrellag, the cooperative marketing organization of Norwegian mackerel fishermen, reports a June 16 bulletin from the Norwegian Information Service.

Thoroughly tested in pilot operations, the method consists of deep-freezing the whole or filleted fish in alginate jelly.

Even after long storage the alginate-frozen product retains the freshness and flavor of fresh fish. This year Norges Makrellag plans to deep-freeze about 1,000

metric tons of mackerel fillets. As soon as more machinery is available the output will be substantially increased.

The fishermen's cooperative, which previously has been deep-freezing whole mackerel, started trial freezing of fillets in alginate jelly last year. These experiments proved so successful that full-scale production has been launched in Kristiansand, Arendal, and Stavanger. Later on, additional plants will be opened in Haugesund and Egersund. The Kristiansand filleting plant uses some 45,000 pounds of raw mackerel a day. A substantial part of the production has been sold abroad.

Pakistan

FIRST CONSIGNMENT OF FROZEN SHRIMP ARRIVES IN UNITED STATES: The first shipment of frozen shrimp from Pakistan reached the United States July 25 at Jersey City, N. J., according to the Consulate General of Pakistan.

The initial consignment of 5,000 pounds was the culmination of 2 years of research and engineering and planning by a Pakistan company located in Karachi. The fish-freezing plant installed by this corporation is the first of its kind in Pakistan. The Pakistan corporation will concentrate its freezing operations on shrimp initially, but within a very short time expects to handle substantial quantities of turtle meat, frog legs, and red snappers.

The shrimp from Karachi waters are reported to average approximately 20 to the pound. The shrimp fishing grounds are all within a radius of 30 miles of the freezing plant. The average time between catching and freezing is 12 hours, with the shrimp boats delivering daily catches to the freezing plant each evening.

Regular monthly shipments to the United States of approximately 50,000 pounds are planned. Full-size shipments are expected to be reached in October 1955. The freezing plant has an annual capacity of approximately 3 million pounds.

While capital for the Pakistan corporation has been supplied jointly by United States and Pakistani interests, it is expected that negotiations will be concluded shortly with an important Japanese firm whereby it will furnish the fishing fleet and deliver the shrimp from the Karachi waters to the freezing plant. Payment to the Japanese firm will be made in the form of a profit-sharing agreement with the Pakistan corporation.

Panama

SHRIMP FISHERY: It is believed that the jumbo shrimp which constitute the bulk of Panama's export product are less than a year old, and probably about seven months. When spawning, each shrimp lays about a million eggs, according to an August 1 report from the Food and Agriculture Organization shrimp biologist assigned to Panama.

The ex-vessel price paid to fishermen for shrimp (50 U. S. cents per pound) is the highest ever, and prospects for continued good catches and good prices are very bright. Local shrimp boats average three 5-day trips per month, and 350-pound catches per day. No night shrimp fishing is done.

The local shrimp monopoly has obtained a sizable loan from the Social Security Fund for expanding operations. Its base of operations is being moved to the Island of Taboga. Tests are now being carried out to determine the possibilities of exporting frozen and dried fish, and of canning tuna.

Peru

TUNA FISHERIES TRENDS, JUNE 1955: The past Peruvian bonito season was normal and inventories were well disposed of on the international markets at low prices because of Japanese competition in both canned and frozen tuna, states a United States Embassy dispatch (June 28) from Lima. However, the tuna industry which is located farther north and whose catch is mostly exported in frozen form reports poor prices and growing unemployment. Fishermen are turning to swordfish and shrimp to offset the low prices paid for fresh tuna; but unemployment continues to grow.

Republic of the Philippines

NO IMPORT TAX FOR IMPORTS OF UNITED STATES CANNED FISH: Canned fish from the United States are among the commodities on which the Philippines will not impose the special tax on imports when the revised trade agreement between the United States and the Philippine Republic goes into effect January 1, 1956, reports a United States Embassy dispatch from Manila.

Products not now subject to the 17-percent tax on foreign exchange will be the same products exempted from the new import tax which is provided for in the revised trade agreement. The Philippine legislature is reported to have completed action creating the new special import tax, which is to be reduced progressively each year. Under terms of the legislation canned fish are among the items on which the import tax will not be imposed in 1956.

The revised trade agreement was signed September 6 at the U. S. Department of State in Washington, D. C.

Portugal

AZORES FISHERY TRENDS: Among the principal cash products produced in the Horta District of the Azores are canned tuna and sperm-whale oil. Some canned tuna has been shipped to the United States, but most of it and all the whale oil goes to European buyers. The price of whale oil this year of 4.5 escudos per kilo (7 U.S. cents a pound) is higher than the prices prevailing in 1953 and 1954, states an August 12 United States consular dispatch from Ponta Delgado.

An American investment of US$40,000 in a whaling and tuna canning plant on the Island of Pico is reported. The tuna industry is threatened to some extent by competition from the freezerships from the European mainland supplying the raw material, and the unsettled market in the United States. Due to the United States import duty on tuna packed in oil of 45 percent, most of the canned tuna sold to the United States is packed in brine.

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FISH CANNING TRENDS, JANUARY 1955: Total Portuguese production of canned sardines in oil or sauce during January 1955 amounted to 1,912 metric tons, valued at 31.7 million escudos (US$1.1 million) to the canners. Production in January 1954 totaled only 1,109 tons, reports the June 1955 Conservas de Peixe, a Portuguese trade magazine.

Production of canned sardines in brine was 84 metric tons in January 1955, valued at 0.4 million escudos (US$13,000), as compared with 16 tons a year earlier.

Portuguese production of canned tuna and tunalike species in oil or sauce in January 1955 totaled only 14 metric tons, valued at 0.4 million escudos (US$15,600) to the canners as compared with 50 tons in January 1954.

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CANNED FISH EXPORTS, MARCH 1955: Sales of Portuguese canned fish on foreign markets in March 1955 maintained a very favorable position, according to the June 1955 Conservas de Peixe, a Portuguese fishery magazine. Total exports of all varieties of Portuguese canned fish amounted to 4,681 metric tons in March, valued at 69.5 million escudos (US$2.4 million), as compared with 3,084 tons a year earlier (see table). During January-March 1955 the total exports amounted to 13,147 tons, valued 198.1 million escudos (US$6.8 million).

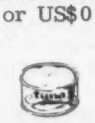
Portuguese Canned Fish Exports, March 1955

Species	Quantity	Value
	Metric Tons	1,000 US$
Sardines in oil or sauce	3,704	1,791
Sardinelike fish in oil or sauce	458	328
Sardines and sardinelike fish in brine	112	20
Tuna and tunalike fish in oil	192	139
Tuna and tunalike fish in brine	21	12
Mackerel in oil	73	47
Other fish	121	64
Total	4,681	2,401

Sardines in oil or sauce comprised the major portion (3,704 tons) of the Portuguese canned fish exports in March 1955, followed by sardinelike fish in oil or sauce (458 tons), tuna and tunalike fish in oil or sauce (192 tons), sardines and sardinelike fish in brine (112 tons), mackerel in oil (73 tons), and tuna and tunalike fish in brine (21 tons).

Canned tuna exports improved in March as compared with the two previous months.

In the January-March 1955 period Germany improved its position as the leading buyer of Portuguese canned fish, receiving a total of 2,437 metric tons, valued at 35.4 million escudos or US$1.2 million (almost entirely sardines in oil), Italy ranked second with 2,182 tons, valued at 31.3 million escudos or US$1.1 million (sardines and tuna in oil). Great Britain was third with purchases of 1,837 tons, valued at 26.6 million escudos or US$0.9 million (almost entirely canned sardines). The United States received 1,127 tons of Portuguese canned fish in January-March 1955, valued at 22.9 million escudos or US$0.8 million (principally 513 tons of sardines and 490 tons of anchovies).



Spain

TUNA CANNERS SHOWING INCREASED INTEREST IN U. S. MARKET: There is a considerable and growing interest in the Bilboa area of Spain in the export of

canned tuna to the United States, a June 24 United States consular dispatch from Bilbao points out. For some time there have been difficulties in obtaining export permits from the Ministry of Commerce. Now, it is understood that those difficulties have been resolved. But perhaps the most important factor is that the recent introduction and rapidly spreading use of live bait by the tuna fishermen in the area has resulted in greater catches.

Catches now greatly exceed domestic needs and, according to a Bermeo fish canner, could be increased a good deal more if a larger market were assured. This fish canner believes that export to the United States could reach 6,000 to 8,000 metric tons a year within a few years, bringing to Spain US$4.5 to US$6 million.

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SARDINES REPORTED SCARCE OFF SANTANDER COAST: The disappearance of sardines off the Santander coast of Spain has aroused considerable interest locally, reports a July 19 U. S. consular dispatch from Bilbao. In recent months there has been additional comment and special attention is being paid to investigations being made by a French scientist (who is the director of the Oceanographic Laboratory of Biarritz) aboard the Donibane off the northern coast of Spain.

Although sardines continue to be caught and brought into Cantabrian ports in small quantities, the catches are nothing like in the past. Many persons have been asking where the sardines have gone, but the French scientist stated in the Santander press (Alerta) that they have not gone away and that he has observed good-sized schools through the detection devices aboard his ship. These schools were seen a half mile from Comillas (Santander) and at the entrance to Santander Bay. He stated that obviously there were not the abundant supplies that there used to be but that he believed that the fish were coming back and would again be abundant. He stated further that he only hoped that Spanish and other fishermen would not fish for the smaller ones. (This is being done on the Cantabrian coast where small sardines are sometimes used as live bait for tuna.)

In this connection, there was recently a press notice that sardines in moderate quantities were being brought into northern Portuguese ports. The local press comments on this situation are that there are still sardines to be caught, that Portuguese equipment is more modern than the Spanish, which is why they catch sardines when the Spanish fail. The article reaches the conclusion that it is up to the Spanish to improve their fishing devices and hunt out the sardine now that they are scarcer than formerly.

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FISHERIES TRENDS, MAY 1955: The Spanish inshore fishing fleet on the North Coast continued to enjoy a heavy catch of anchovies during May, reports a July 1 U. S. Embassy dispatch from Madrid. Although the benefits to the fishermen were not increased proportionately because the large supplies caused a serious decline in prices, the fishing and fish-canning industries found the situation much better than a year ago when catches were very small. Additional optimism among these groups was generated by improved prospects for a good tuna season and the increasing possibilities that considerable quantities of canned tuna might be exported to the United States.

Short-range fleet owners of the Vigo area in northwestern Spain, who had been experiencing difficulties due to the inadequacies of their outmoded vessels and equipment, received a Ps. 25 million (US$1.1 million) modernization loan from the semi-official Marine Credit Bureau. This should assist them to take advantage of new fishing methods and techniques and increase production.

Union of South Africa

FISHERIES TRENDS, APRIL 1955: Large quantities of fish were caught in waters off the Union and South-West Africa during April, and as they consisted principally of maasbankers (jack mackerel), the output of fish meal and fish oil reached record levels, reports a June 10 United States consular dispatch from Cape Town.

There was a heavy demand for canned fish, but the pack was disappointing. Production of canned and frozen spiny lobster was heavy. The market for spiny lobster and fish oil remained steady, but the demand for fish meal weakened slightly.

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DEVELOPMENT OF FROZEN FISH INDUSTRY: Quick freezing is the latest and fastest developing aspect of one of the leading South African firms engaged in fish trawling, the July 1955 issue of The South African Shipping News and Fishing Industry Review points out. Quick freezing was started about four years ago with a normal blast freezer. Last year the company installed two contact-plate freezers and since then four more of these freezers have been installed.

Intensive advertising to break down initial consumer apathy has created a big market for quick-frozen fillets and the company now turns out several different packs.

Some months ago, this company started to produce quick-frozen fish sticks. The installation of the freezers gave the firm the plant it needed for its venture in fish sticks. The first products soon proved so successful that special machines were installed to cut the blocks and this year a German automatic machine was found to produce ideal fillets for fish sticks.

The company not only supplies the local market with quick-frozen fillets and fish sticks, but it is also building up a substantial export market.



United Kingdom

"FAIRTRY" LANDS ONE MILLION POUNDS OF FROZEN FILLETS ON FOURTH TRIP: The British factoryship trawler Fairtry landed one million pounds of frozen fillets at Immingham on May 31 after a trip of just over three months, reports the June 10 issue of The Fishing News, a British fishery magazine.

This was the Fairtry's fourth trip, slightly longer than the previous ones. In line with the owners' policy of filleting as much of the catch as possible, a greater amount of fillets was produced on this trip.

The bulk of the production was cod and haddock fillets, with small quantities of coalfish (pollock), halibut, and skate wings. Most of the catch was sold in advance, but buffer stocks of most varieties were reserved for day-to-day requirements.

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NEW HERRING PRESERVATIVE TESTED: A new preservative for herring awaiting processing was to be tried out in August 1955 by the British Herring Industry Board, an August 5 United States Embassy dispatch from London reports. This was the answer from the Chairman of the Board to criticism that the glut of herring (greater than ever before) was mishandled. If the test is successful it will open the way to a bright economic future for the British herring oil and meal industry.

The Chairman of the Herring Industry Board said in part: "The Herring Industry Board has for 10 years been pioneering in quick freezing and urging the trade to take up this process. Interest seemed to be quickening. But while freezing can become a valuable additional outlet it never will be a solution for gluts of herrings for which the only economic use in sight is reduction to oil and meal.

"In this field the tasks that lie before the board are (1) to complete their own factory building program for oil and meal, and (2) to discover a chemical which is technically economical and suitable for preserving the herring awaiting processing.

"The factory program is well advanced.

"For a long time we and our scientific advisers have been seeking the preservative that is needed. Various substances have been tried but each have had a drawback of one kind or another. After having experienced a good many disappointments I hesitate to predict success but I can tell you that yet another pilot-scale trial is just about to begin with a preservative which appears to have useful possibilities. If our hopes are realized on a commercial scale, the technical problem of months will have been solved and the way will be opened to a bright economic future for oil and meal."

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RUSSIA RE-IMPOSES TWELVE-MILE TERRITORIAL LIMIT FOR BRITISH TRAWLERS: British fishermen are now barred from fishing up to a three-mile limit from the Russian coast. The Anglo-Soviet Agreement of May 1930 expired on July 5, 1955, and the Russian Government notified the British Ambassador at Moscow on June 24 that it could not renew the agreement for a further period but was willing "to begin negotiations on the possibility of concluding a new agreement."

British fishermen will now be able to operate only outside the 12-mile limit claimed by Russia as territorial waters, according to The Fishing News of July 8, 1955.

The agreement ran until January 5, 1953, when the Russian Government invoked the clause enabling it to give six months' notice of termination. However, after representations from the British Government, the Russians agreed to an extension for one year and again for another year.

Iceland's newly declared limits had meant more intensive fishing off Russia. Hull ships this year netted a quarter of their catch off the Russian coast, Grimsby ships a sixth, and Fleetwood ships a tenth.

Iceland and Norway have both instituted four-mile limits which have cut British trawlermen off from vast areas of fishing grounds, according to the British.

The secretary of Hull Trawler Officers' Guild points out that if the Russians revert to the 12-mile limit of their territorial waters, Hull skippers would lose the use of several prolific plaice-catching grounds inside the area.

The heavy fishing for cod and other types was carried on much farther away from the coasts and would not be affected.



FEDERAL ACTIONS

Department of Defense

QUARTERMASTER MARKET CENTER

OPTIONAL INSPECTION AND TESTING PROCEDURE:

The Quartermaster Market Center Operations Division in Chicago issued on July 13 the following Notice to the Trade on Inspection and Testing Procedure:

A new procedure for the inspecition and testing of component packaging, packing, and marking materials of nonperishable subsistence items has recently been adopted on all Quartermaster Market Center contracts. The procedure, designated the "Certificate of Compliance (and Analysis) Acceptance Procedure," is designed to expedite acceptance of shipments and subsequent payment to contractors. The procedure is entirely optional to contractors, and may be employed to gain immediate acceptance of packaging, packing, and marking materials, in lieu of awaiting results of Government laboratory acceptance testing, as long as the contractor maintains continued eligibility for the procedure. Contractors will be acquainted with the details by a representative of the Quartermaster Corps Inspection Service Command prior to or at the time inspection is conducted.

Salient features of the procedure are as follows:

a. Samples for Government laboratory testing will be drawn from all lots of component material required to be in conformance with a Federal or Military specification, or otherwise having test characteristic requirements.

b. In lieu of awaiting test results on component materials on items of domestic pack, the contractor may furnish the Inspector with a Certificate of Compliance stating that material complies with requirements, to be signed by a responsible company official.

c. In lieu of awaiting test results on component materials for items of export pack, the contractor may furnish a Certificate of Compliance and Analysis. This must be accomplished on Standard DA Form 694, blank copies of which will be supplied by the Inspector or Inspection Office. The form must show an acceptable test result for each component test requirement. Test results may be furnished by supplier of material, commercial laboratory or contractor's own laboratory.

d. In the event Government laboratory testing indicates non-compliance with requirements of materials previously certified as meeting requirements, contractor's eligibility for procedure will be withdrawn, and acceptance delayed until results of Government laboratory testing become available. Contractor eligibility may be reinstated at a future date at the discretion of the Quartermaster Inspection Service.

Particular attention is invited to the clause below which is included in the majority of Marine Corps and Department of the Navy Contracts. Both agencies have been experiencing difficulty with unauthorized shipments, and the purpose of the clause is to eliminate the practice of shipment prior to receipt of inspection results. Therefore, the cooperation of all vendors is earnestly solicited to insure that proper inspection certificates or reports are accomplished prior to shipment. Contracts will include separate instructions to the effect that properly accomplished Inspection Certificates must accompany all shipments consigned to Navy or Marine Corps destinations. Receiving installations will refuse to accept shipments in the absence of such a certificate, treating each such failure as an unauthorized shipment. Quartermaster Inspectors and Inspection Offices have accordingly been instructed to advise contractors regarding the Navy and Marine Corps position on "improper" or unauthorized shipments.

SHIPMENT, PRIOR AUTHORIZATION

The contractor shall make no shipment under this contract unless the Department of Defense Material Inspection Receiving Report, other inspection report or inspection certificate, covering said shipment has been previously signed by the Government inspector, except where such shipment is otherwise specifically authorized by the contracting officer. Should the contractor make shipment contrary to the provisions of this clause, the shipment shall be considered unauthorized and the Government shall have the option of either returning such shipment at the contractor's expense or storing same, in either event holding the contractor chargeable for all additional expenses, charges and fees including those for transportation, handling, and storage incurred by the Government as a result of said unauthorized shipment. For purposes of this clause, handling and storage fees shall be computed from the date of receipt of the unauthorized shipment at destination, to and inclusive of the date of final acceptance or the date said shipment is shipped back to the contractor if rejected, on the basis of actual costs to the Government.

NOTE: The above clause is included in contract clause sheets as indicated below:

Clause #6, Clauses OPD 1003, 1 July 1955, "Special Provisions for Marine Corps Contracts."

Clause #8, Clauses OPD 1005a and b, 1 July 1955, "Special Provisions for Navy F.O.B. Origin Non-Property Receipt Contracts (N-P)."

Clause #8, Clauses OPD 1006a and b, 1 July 1955, "Special Provisions for Navy F.O.B. Destination Contracts (N-P)."

Comments and/or suggestions concerning the above-described procedure are invited and should be directed to the nearest Quartermaster Market Center office.



Office of Defense Mobilization

CERTIFICATES OF NECESSITY FOR CERTAIN INDUSTRIES SUSPENDED: The issuance of Certificates of Necessity for expansion goals of certain industries was suspended by Director of Defense Mobilization order OD-LA No. 416 (8-11-55). Certificates of Necessity provided accelerated tax amortization for certain industries which were considered important to National Defense.

Certificates of Necessity will no longer be issued for the expansion goals of these industries:

Goal No.	Title	Delegate Agency
218	Inland Waterway Terminal Facilities	ICC
98	Inland Waterway Vessels (Specific Types)	ICC
216	Motor Truck Terminal and Repair Facilities	ICC
217	Warehousing and Storage Facilities	ICC



Federal Trade Commission

PROPOSED TRADE PRACTICE RULES ISSUED FOR FROZEN FOOD INDUSTRY: For the consideration and hearing of industry members and other interested or affected parties, the Federal Trade Commission on August 11 issued "Proposed Trade Practice Rules for the Frozen Food Industry." These rules will affect any person, firm or organization engaged in the production and marketing of all frozen foods, including frozen fishery products.

These proposed rules were discussed at a public hearing scheduled to begin in Washington, D. C., on September 8, 1955. The Commission extended an opportunity to all persons, firms, corporations, and organizations, including labor and consumer groups, to present their views concerning the proposed rules in writing before that date or orally at the hearing. These proceedings were instituted pursuant to an industry application for the establishment of a set of trade practice rules directed to the maintenance of a fair competitive basis in the industry. After consideration of the views presented orally or in writing, the Commission will proceed to final action on the proposed rules.

The industry for which trade practice rules are sought to be established through these proceedings is composed of persons, firms, corporations, and organizations engaged in the production and/or marketing of vegetables, fruits, juices, fish and shellfish, baked goods, and other miscellaneous prepared foods, which are packed, marketed, and delivered to the ultimate consumer in a frozen state. (Not included as products of the industry are meats and poultry, and frozen dairy products, including ice cream and sherbets.) Rules for this industry, upon their final approval and promulgation by the Commission, will supplant the trade practice rules for the Grocery Industry promulgated March 18, 1952, with respect to those items identified as products of the Frozen Food Industry.

The rules are divided into two groups. Group I rules inhibit only such practices as are considered by the Commission to be illegal under laws administered by it. Included are prohibited discrimination; exclusive deals; prohibited sales below cost; push money; fictitious prices; false invoicing, billing, etc.; coercing the purchase of one product as a prerequisite to the purchase of other products; misrepresentation in general; defamation of competitors or false disparagement of their products; enticing away employees of competitors; substitution of products; inducing breach of contract; use of lottery schemes, etc.; prohibited forms of trade restraints (unlawful price fixing, etc.); use of the word "free;" misrepresenting products as conforming to standards; procurement of competitors' confidential information; and aiding or abetting use of unfair trade practices. Group II rules include contractual obligations and proper refrigeration, and although their violation does not per se constitute violation of law, corrective proceedings in respect thereto may be constituted by the Commission.



Small Business Administration

GOVERNMENT LOANS AVAILABLE IN DISASTER AREAS:

The Small Business Administration in mid-August designated a limited number of counties in the states of Massachusetts, Rhode Island, New York, New Jersey, and Pennsylvania, and all counties in Connecticut and Delaware, as disaster areas. These areas were harmed in August by floods and high waters. Residents and businesses in these areas which suffered such damage are eligible for rehabilitation loans from SBA.

On August 15 the Small Business Administration also declared 10 counties in North Carolina and 1 county in South Carolina hit by hurricane "Connie" as disaster areas eligible for rehabilitation loans from SBA. The counties included are as follows:

South Carolina: Horry.
North Carolina: Beaufort, Brunswick, Carteret, Craven, Jones, Lenoir, New Hanover, Onslow, Pamlico, Pender.

These actions permit persons suffering damage to their homes or business to apply to SBA for disaster loans to help in repairing the damage. The loans are made at 3 percent interest with terms up to 20 years for repayment. Persons suffering damage in adjacent areas from the same cause may also apply for such loans.

Temporary disaster loan offices were opened to receive applications from disaster victims. Applications were also received at branch offices and at regional offices.

Emergency aid in addition to SBA loans is available from the Federal Government in the disaster areas. Some of the various types of aid to be provided are as follows:

1. Free distribution of surplus Government property including boats on an "as is where is" basis. This distribution will be effected through the State Property Officer of the individual states.

2. Large-scale distribution of food from Federal surplus food stocks. This distribution will be effected through the officer in the individual state handling surplus food commodity distribution.

3. One hundred percent insurance on FHA insurance of loans.

Contact the Regional Director of the Federal Civil Defense Administration in the area for further details on such aid.



Department of State

JAPAN BECOMES PARTY TO GATT:

The Executive Secretary of the General Agreement on Tariffs and Trade announced on August 11 that more than two-thirds of the contracting parties to the General Agreement have cast favorable votes on a decision for the accession of Japan to the General Agreement. Accordingly, Japan will become a contracting party on September 10, 1955, and, as previously indicated the tariff concessions negotiated between the United States and Japan will become effective on the same date, the U. S. Department of State announced on August 22.

In accordance with the provisions of the Protocol for the Accession of Japan, United States concessions to countries other than Japan in connection with the negotiations for Japan's accession will be made effective 30 days after such countries notify the Executive Secretary that their concessions to Japan are being placed in effect. The Governments of Canada and Denmark have given notification that their concessions to Japan will become effective on September 10, 1955, and the concessions made by the United States to Canada and Denmark, in consideration of their concessions to Japan, will go into effect on the same date. Concessions on the items listed below are being withheld until further notice because the countries to which they were made have not given notice of the effective date of their concessions to Japan.

The President has notified the Secretary of the Treasury of the effective date for the concessions to Japan, Canada, and Denmark. The notification, which will be published in the Federal Register, reads as follows:

MEMORANDUM FOR THE SECRETARY OF THE TREASURY, AUGUST 22, 1955

"Reference is made to my proclamation of July 22, 1955, carrying out the Protocol of Terms of Accession by Japan to the General Agreement on Tariffs and Trade and for other purposes.

"Pursuant to the procedure described in Part I (b) (1) of that Proclamation, I hereby notify you that all items in Part I of Schedule XX to the Protocol for the accession of Japan, with the exception of the items specified below, shall not be withheld pursuant to paragraph 4 of said Protocol on and after September 10, 1955. . ." The fishery items which shall continue to be withheld until further notice are:

Item Designation	Description
717 (c)	Fish, dried and unsalted, other than cod, haddock, hake, pollock, and cusk (except shark fins)
720 (a) (2)	Herring, whole or beheaded, but not further advanced, if hard dry-smoked

* * * * *

PHILIPPINE-UNITED STATES TRADE AGREEMENT SIGNED:

A revised agreement between the Republic of the Philippines and the United States regarding trade arrangements and related matters was signed September 6, 1955, at the Department of State. The agreement was signed on behalf of the Philippines by General Carlos P. Romulo, Special and Personal Envoy of the President of the Philippines; James M. Langley, Special Representative of the President of the United States of America, signed on behalf of the United States.

The title of the agreement is "Agreement between the United States of America and the Republic of the Philippines concerning Trade and Related Matters during a Transitional Period following the Institution of Philippine Independence, signed at Manila on July 4, 1946, as revised." The authorizing legislation of the U. S. Congress is Public Act 196, "Philippine Trade Agreement Revision Act of 1955," according to a Department of State news release.

The 1946 Trade Agreement was entered into at the time the Philippines gained its independence. At that time there were no precedents to indicate exactly how the problems of the new relationship which was to exist between the Philippines and the United States might best be met. During the nine years of operation of this agreement, problems arose on both sides suggesting the need for revisions. These revisions, affecting every article of the agreement, provide for adjustments which better accommodate the current and future economic interests of both nations and effect changes in their relationships which were mutually felt desirable as a result of the experiences of the Philippines in handling its political and economic problems since the Philippines became independent in 1946. The modification of transitional tariff schedules coupled with the elimination of an exchange tax in the Philippines is an important element of the revised agreement.

The further economic development of the Philippines is one of the objectives of the new agreement. Such development, in addition to enhancing the importance of the Philippines as a trading partner of the U. S., serves to strengthen a staunch friend and close ally.

Note: Also see Commercial Fisheries Review, February 1955, p. 49.

Eighty-Fourth Congress (First Session)

AUGUST 1955

Listed below are public bills and resolutions introduced and referred to committees or passed by the Eighty-Fourth Congress (First Session) and signed by the President that directly or indirectly affect the fisheries and allied industries. Public bills and resolutions are shown in this section when introduced and, if passed, when signed by the President; but also shown from month to month are the more pertinent reports, hearings, or chamber actions on some bills.



ADJOURNMENT: The First Session of the 84th Congress adjourned, sine die, on August 2. Congress will reconvene in January 1956, unless the President calls a special session.

GREAT LAKES FISHERIES CONVENTION: Report from Committee on Foreign Relations to accompany Executive B, 84th Congress, 1st. Session, May 23, 1955, 6 p.

GREAT LAKES FISHERY TECHNOLOGICAL LABORATORY: S. 2707 (Potter), introduced July 30. A bill direct-

ing the Secretary of the Interior to establish, under the Fish and Wildlife Service, a technological laboratory to serve the Great Lakes region; to the Committee on Interstate and Foreign Commerce.

ORGANIZATION FOR TRADE COOPERATION: H. R. 5550, a bill which would authorize United States participation in the Organization for Trade Cooperation. The President agreed to postpone hearings on the bill until next year, according to the Chairman of the House Ways and Means Committee on July 19. The Chairman states that the bill will be one of the first considered by the Committee in 1956.

PHILIPPINE TRADE AGREEMENT REVISION ACT OF 1955: The President on August 1 signed H. R. 6059 (Cooper), a bill to authorize the President of the United States to enter into an agreement with the President of the Republic of the Philippines to revise the 1946 trade agreement between the United States of America and the Republic of the Philippines (P. L. 196, 84th Congress).

TRADE AGREEMENTS: Trade Agreements Extension Act of 1955, House Report No. 745 (June 9, 1955, 84th Congress, 1st Session), 7 pp., printed. This is a conference report on H. R. 1, a bill to extend the authority of the President to enter into trade agreements under section 350 of the Tariff Act of 1930, as amended, and for other purposes.

TRANSPORTATION OF MOLLUSK SHELLS: H. R. 7807 (Boggs), introduced August 1. A bill to provide that the transportation of mollusk shells (including clam and oyster shells) from the point of extraction to the dockside shall be taken into account in computing percentage depletion; to the Committee on Ways and Means.

Also H. R. 7819 (Thompson of Louisiana) and H. R. 7820 (Thompson of Texas), introduced August 1, similar to H. R. 7807.

TILAPIA

A number of popular magazines in this country have published articles dealing with tilapia, describing the success with which Tilapia mossambica has been propagated as a food fish in various Asiatic countries. The considerable public interest aroused by these articles has been reflected in the offices of the U. S. Fish and Wildlife Service by the number of inquiries received from people who wanted information about the possibility of raising tilapia in the United States.

Because of the widespread interest in propagating in this country the highly-praised tilapia, it seems advisable to call attention to several points that merit careful consideration before culture of the fish is undertaken.

Originally a native of tropical Africa, tilapia is quite unable to withstand the climatic conditions that prevail in most of the United States. The fish will not survive temperatures below the range of 50° to 55° F.



Tilapia (Tilapia mossambica)

With regard to growth or production under our conditions, tilapia apparently can offer little advantage over domestic species. Tilapia has a high reproductive potential--as have many fishes--and would develop stunted overpopulations in such ponds as provided suitable habitat. Fish of very small size--although they may be acceptable to the protein-hungry peoples living in various crowded Asiatic countries--are not regarded as edible in the United States.

Tilapia may be purchased from dealers in aquarium fishes in the United States. Private individuals are cautioned, however, against stocking or propagating tilapia without first obtaining the approval or permission of their state conservation department.

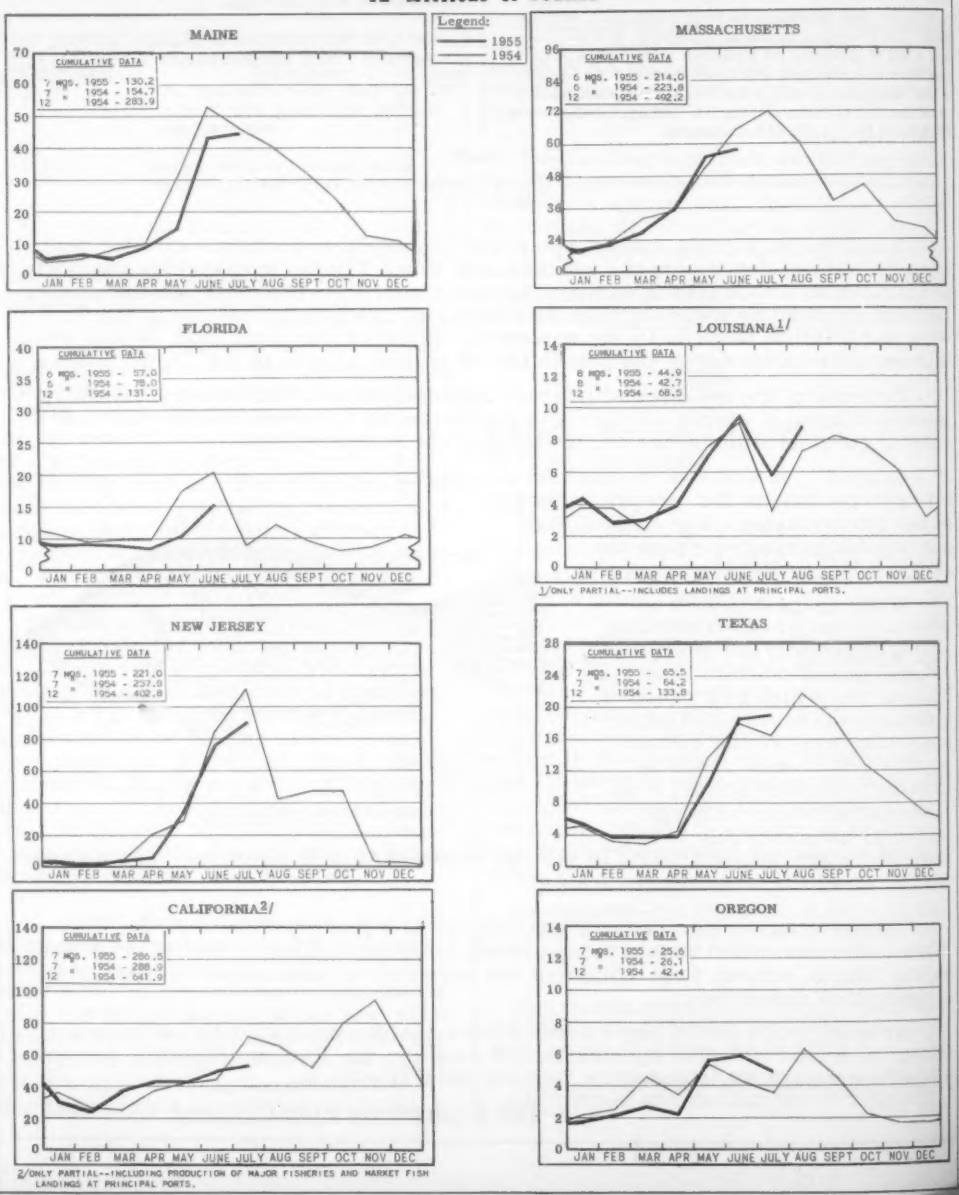
At least until careful experimental work has demonstrated the usefulness of tilapia as a food or sport species in this country, the Fish and Wildlife Service cannot encourage its introduction into our natural waters.

--The Progressive Fish-Culturist, April 1955.

FISHERY INDICATORS

CHART 1 - FISHERY LANDINGS for SELECTED STATES

In Millions of Pounds

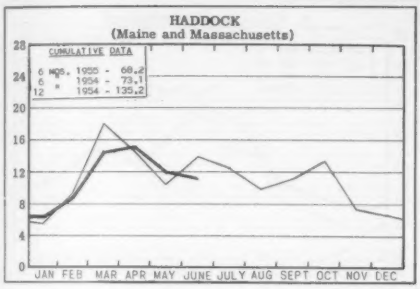


1/ONLY PARTIAL--INCLUDES LANDINGS AT PRINCIPAL PORTS.

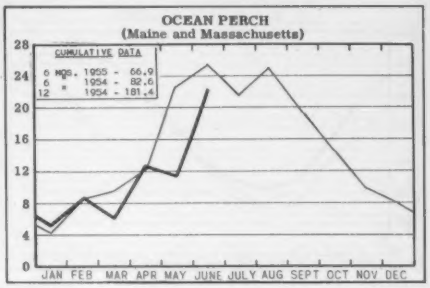
2/ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

CHART 2 - LANDINGS for SELECTED FISHERIES

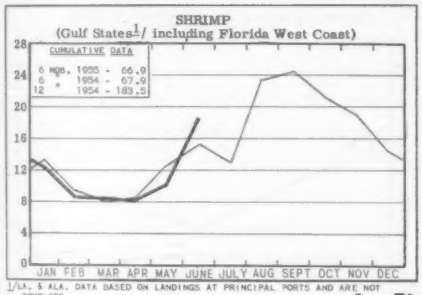
In Millions of Pounds



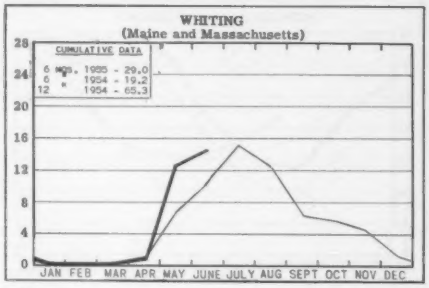
Legend:
1955
1954



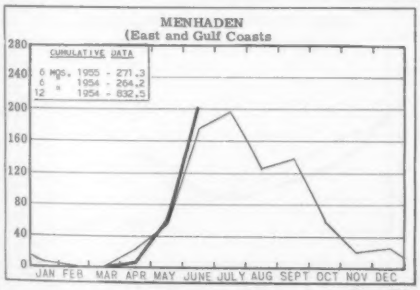
In Millions of Pounds

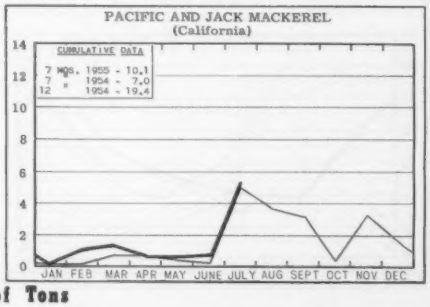


1/LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

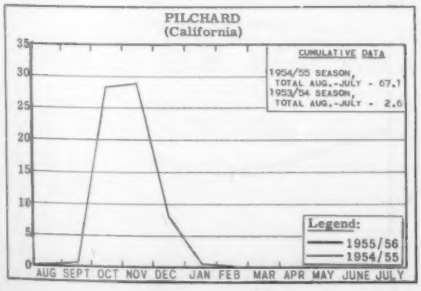


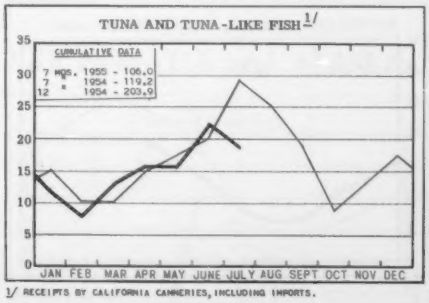
In Thousands of Tons





In Thousands of Tons

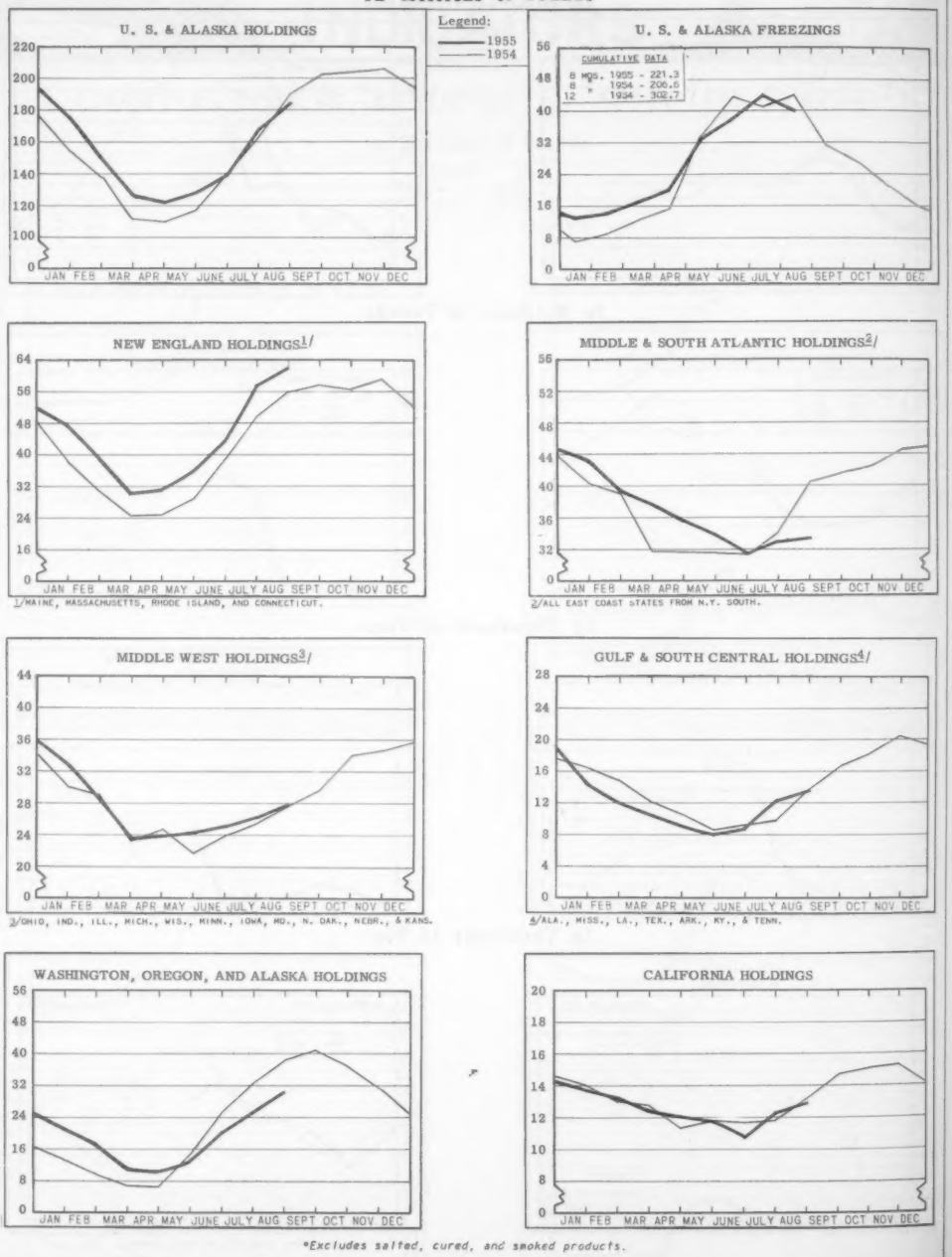




1/ RECEIPTS BY CALIFORNIA CANNERIES, INCLUDING IMPORTS.

CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

In Millions of Pounds



1/MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT.

2/ALL EAST COAST STATES FROM N.Y. SOUTH.

3/OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR., & KANS.

4/ALA., MISS., LA., TEX., ARK., KY., & TENN.

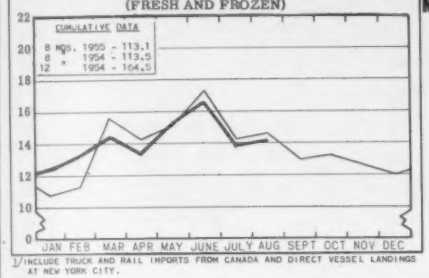
*Excludes salted, cured, and smoked products.

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pound

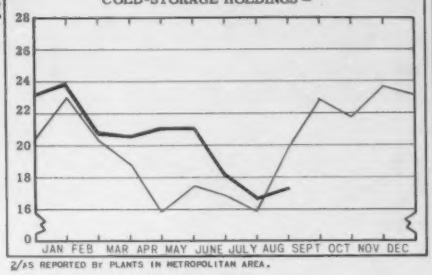
NEW YORK CITY

RECEIPTS[1] AT WHOLESALE SALT-WATER MARKET (FRESH AND FROZEN)



1/ INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.

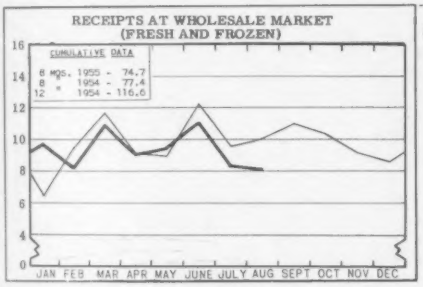
COLD-STORAGE HOLDINGS [2]



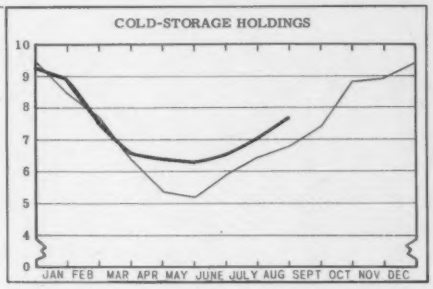
2/ AS REPORTED BY PLANTS IN METROPOLITAN AREA.

CHICAGO

RECEIPTS AT WHOLESALE MARKET (FRESH AND FROZEN)

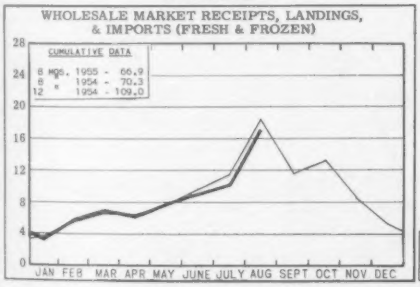


COLD-STORAGE HOLDINGS



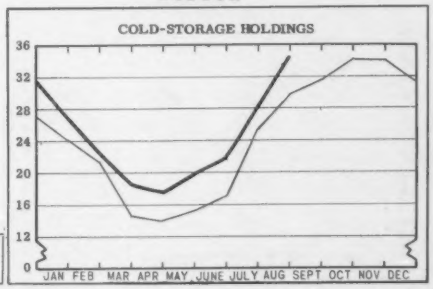
SEATTLE

WHOLESALE MARKET RECEIPTS, LANDINGS, & IMPORTS (FRESH & FROZEN)



BOSTON

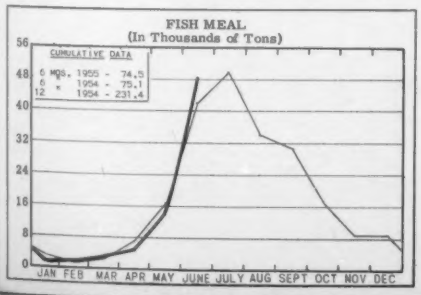
COLD-STORAGE HOLDINGS



Legend:
1955
1954

CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA

FISH MEAL
(In Thousands of Tons)



FISH OIL
(In Millions of Gallons)

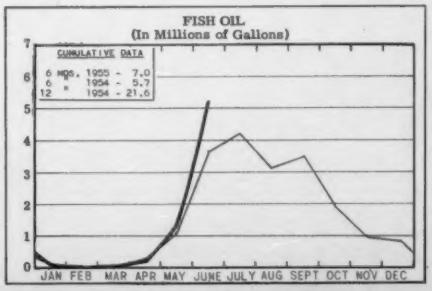
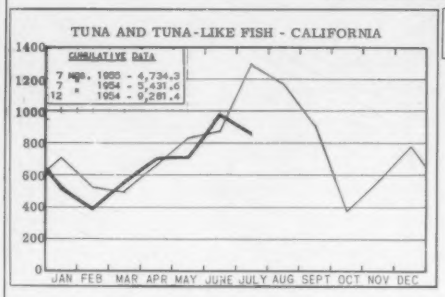
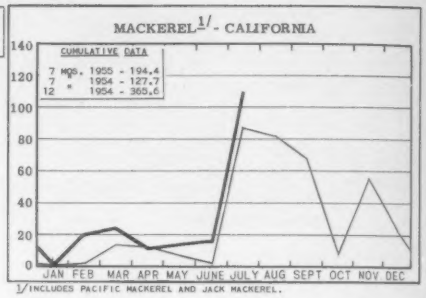


CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

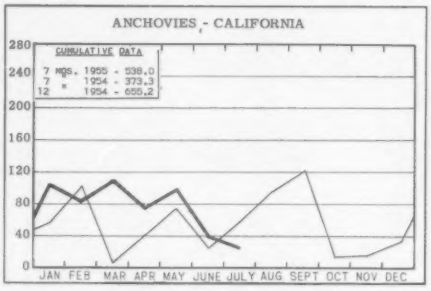
In Thousands of Standard Cases

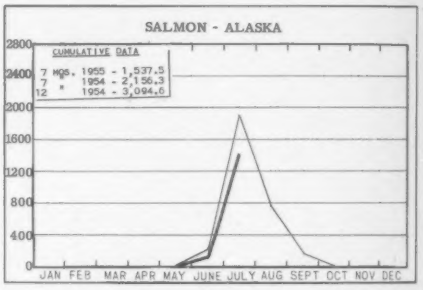


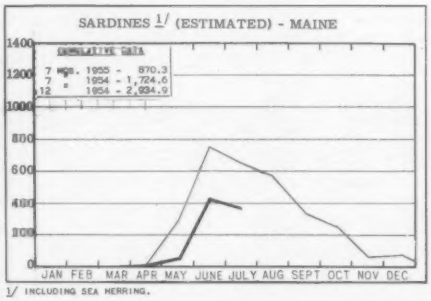
Legend:
1955
1954



1/ INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.



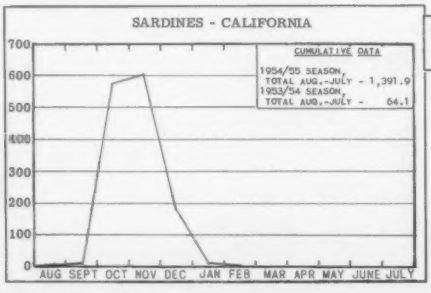




1/ INCLUDING SEA HERRING.

STANDARD CASES

Variety	No. Cans	Can Designation	Net Wgt.
SARDINES	100	¼ drawn	3¾ oz.
SHRIMP.....	48	--	5 oz.
TUNA	48	No. ½ tuna	6 & 7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
SALMON	48	1-pound tall	16 oz.
ANCHOVIES	48	½ lb.	8 oz.



Legend:
1955/56
1954/55

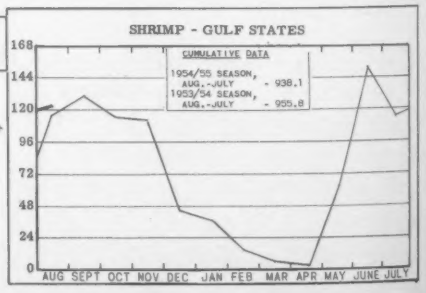
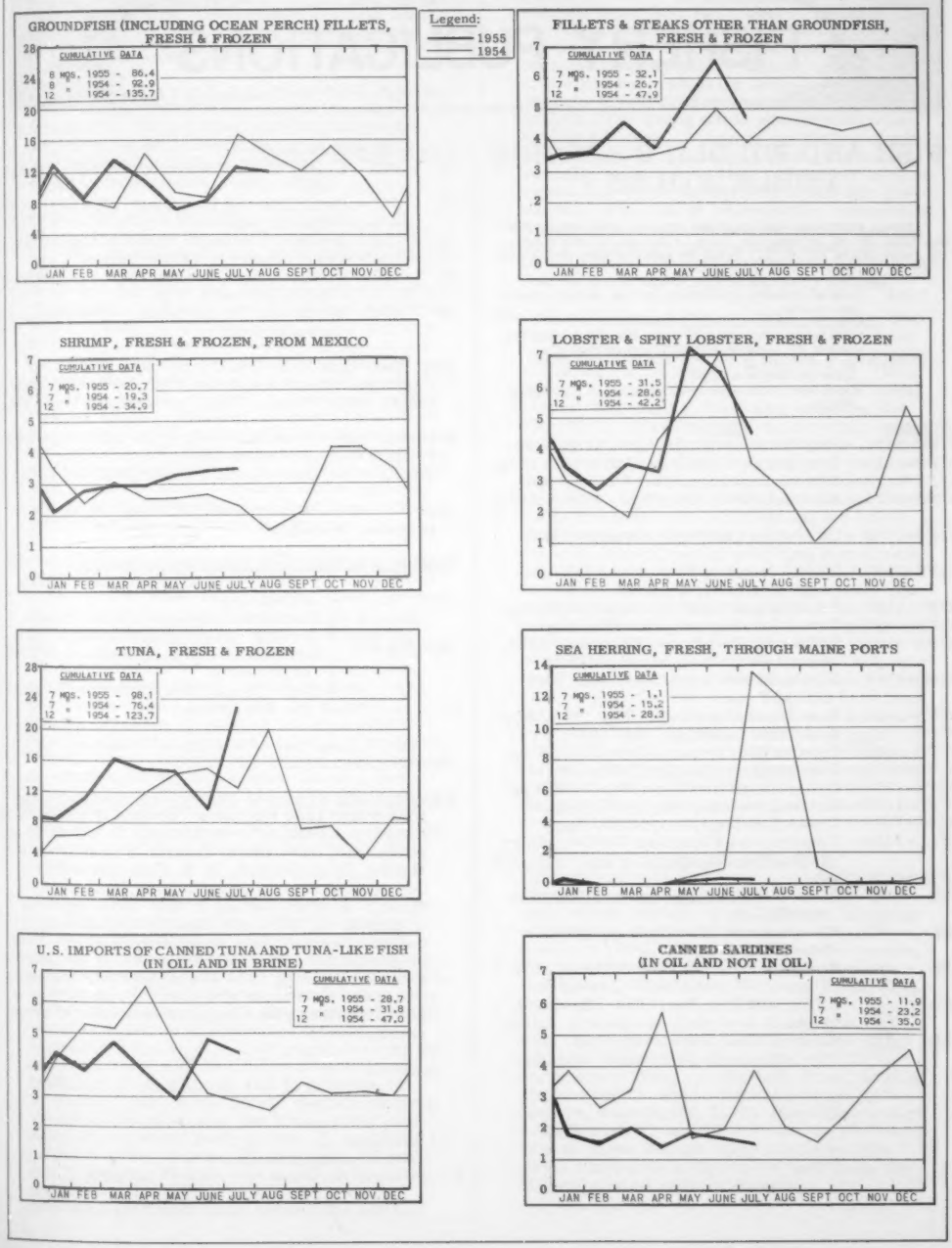


CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds





FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
FL - FISHERY LEAFLETS.
SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SSR.-FISH - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number Title

CFS-1154 - New York Landings, April 1955, 4 pp.
CFS-1156 - New Jersey Landings, April 1955, 2 pp.
CFS-1158 - Florida Landings, March 1955, 6 pp.
CFS-1159 - Massachusetts Landings, March 1955, 5 pp.
CFS-1160 - California Landings, January 1955, 4 pp.
CFS-1161 - Middle Atlantic Fisheries, 1953 Annual Summary, 5 pp.
CFS-1162 - Rhode Island Landings, April 1955, 3 pp.
CFS-1163 - Texas Landings, April 1955, 3 pp.
CFS-1164 - California Landings, February 1955, 4 pp.
CFS-1165 - Alaska Fisheries, 1954 Annual Summary, 6 pp.
CFS-1166 - New Jersey Landings, May 1955, 2 pp.
CFS-1168 - New York Landings, May 1955, 4 pp.
CFS-1169 - Frozen Fish Report, June 1955, 8 pp.
CFS-1172 - Fish Meal and Oil, May 1955, 2 pp.
CFS-1176 - Rhode Island Landings, May 1955, 3 pp.
CFS-1177 - Maine Landings, May 1955, 4 pp.
CFS-1178 - Texas Landings, May 1955, 3 pp.
FL -336y - Commercial Fisheries Outlook, July-Sept. 1955, 29 pp.

Firms Canning:

SL - 103 - Tuna and Tunalike Fishes, 1954 (Revised), 2 pp.
SL - 105 - Alewives and Alewife Roe, 1954 (Revised), 1 p.
SL - 107 - Fish and Shellfish Specialities, 1954, 7 pp.
SL - 109 - Caviar and Fish Roe, 1954 (Revised), 2 pp.
SL - 112 - Shrimp, 1954 (Revised), 2 pp.

Firms Manufacturing:

SL - 152 - Oyster Shell Products, 1954 (Revised), 1 p.
SL - 153 - Fish Glue and Isinglass, 1954 (Revised), 1 p.
SL - 154 - Seaweed Products, 1954 (Revised), 1 p.
SL - 156 - Pearl Essence, 1954 (Revised), 1 p.
SL - 159 - Fresh-Water Mussel-Shell Products, 1954 (Revised), 1 p.
SL - 160 - Menhaden Oil and Meal, 1954 (Revised), 2 pp.

SSR-Fish. No. 155 - Pacific Sardine (Pilchard) Eggs and Larvae and Other Fish Larvae, Pacific Coast, 1953, 76 pp., illus., processed, May 1955.

Sep. No. 409 - Reduction of Curd in Canned Salmon Prepared from Frozen Fish, Part I - Use of Tartaric-Acid and Sodium-Chloride Brine Dips.

Sep. No. 410 - Winter Smelt Fishing Out of Enscanaba, Michigan.

Research in Service Laboratories Section:

Sep. No. 411 - Federal Specifications for Fishery Products.
Chemical Changes in Fish Protein During Freezing and Storage.
Unidentified Growth Factors in Fish Byproducts.
Fish Oil and Meal Samples Collected for Evaluation.

THE FOLLOWING SERVICE PUBLICATION IS AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED:

Landings and Prices of Fishery Products, Boston Fish Pier, 1954 (Includes "Trends in the Fishing Industry at Boston"), by Thomas J. Risoli, 15 pp., processed, June 1955. (Available free from the Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Fish marketing trends and conditions in Boston for 1954 are discussed in this publication. Detailed data on landings and ex-vessel prices of fish and shellfish landed at the Boston Fish Pier during 1954 are presented. Statistics are given by months and species and by type of gear, together with comparative data for previous years.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

La Biologia Marina y la Pesca, by Carlos G. Aguayo, Contribucion No. 5 del Centro de Investigaciones Pesqueras, 48 pp., illus., printed in Spanish. Dependencia de la Division Agricola del Banco de Fomento Agricola e Industrial de Cuba, Playa Habana, Bauta, Cuba, 1954.

(Canada) Fisheries Statistics of Canada, 1953, 34 pp. (tables), printed in English and French, C$1.25. Dominion Bureau of Statistics, Ottawa, Canada, 1955. A review of the fishery statistics of Canada for 1952 and 1953 prepared in collaboration with Dominion and Provincial Fisheries Departments. It includes data on the quantity and value of the catch of fishery products for Canada as a whole (excluding Newfoundland); production of fish oils and fish meal; production of frozen, salted, smoked, pickled, and canned fish; shellfish production; employment in fish-processing establishments; and value of exports and imports of fishery products. Also contains data on the total value of the fisheries by province for 1944-1953; Canada's lobster pack by province for 1944-1953; and fishing bounties paid to vessels and boats in 1953.

(Canada) Summary Statistics of Canada's Fisheries 1934-1953 (Plus Review of Statistics by Areas for 34 years, 1920-1953), 32 pp., illus., printed. (Reprinted from Canadian Fisheries Annual, 1955, pp. 81-112.) Department of Fisheries, Ottawa, Canada. Includes quantity and value of fishery products by areas, by provinces (excluding Newfoundland), and by species; fresh and frozen fillet production; and exports of fishery products by species and by countries. Graphs illustrate landings of fish and shellfish, landed values, and percentages of total landings by species for the Maritimes, Quebec, and British Columbia from 1934-1953; fresh-water fisheries; Canadian imports and exports by form and by country; and estimated production of salted codfish in Newfoundland from 1934-1953.

"A Contribution to the Life Histories of Commercial Shrimps (Penaeidae) in North Carolina," by Austin B. Williams, article, Bulletin of Marine Science of the Gulf and Caribbean, vol. 5, no. 2, June 1955, pp. 116-146, illus., printed. University of Miami Press, Coral Gables, Fla. (Also Contribution No. 38, University of North Carolina Institute of Fisheries Research, Morehead City, N. C.) This paper reviews the estuarine portion of the life histories of Penaeus setiferus, P. duorarum, and P. Aztecus in North Carolina. After larval migrations from spawning places at sea, the young enter estuaries as benthonic post-larvae. P. setiferus is judged to grow 36 mm., P. duorarum 52 mm., and P. aztecus 46 mm. per month in brackish nursery areas during the warmer months. Juveniles gradually move toward the sea as they approach mature sizes. P. aztecus recruitment is greatest in May. The earliest recruits reach commercial size by July. No juveniles and few adults overwinter in North Carolina. P. duorarum recruitment extends from June to October. The earliest recruits reach commercial size in autumn, but the remainder overwinter and attain commercial size in spring. Mature adults occur in the littoral zone prior to the recruitment period. P. setiferus recruitment occurs chiefly in June. The young attain commercial size by late summer. A sparse population of adults overwinters in the littoral zone. These are sexually mature in spring. A number of ecological factors in the nursery areas are discussed. The role of interspecific competition for nursery areas is considered. P. aztecus and P. duorarum occupy these areas at different times. P. setiferus may compete with both of these species for nursery ground.

(Delaware) Biennial Report, 1953 and 1954, Publication 2, 83 pp., illus., printed. Marine Laboratory, Department of Biological Sciences, University of Delaware, Newark, Del., Dec. 1954. This report describes the work of the Marine Laboratory, its major projects and objectives, activities, and accomplishments during 1953-54. Among the subjects included is an evaluation of the magnitude of the commercial and sports fisheries of the State of Delaware. Complete 1952 commercial fishery statistics have been compiled for the entire State and for each county. The catch by species, by county, and by gear has been assembled and summarized. Total landings of the menhaden fishery, trawl fishery, oyster and crab fishery have been assembled for the years 1952, 1953, and as much of 1954 as is available. These records are estimates of production based on interviews and dock landings. The landings of the trawl fishery by species by year for the years 1947-54 have been summarized. These are from dock landing records. The fisheries research program includes discussions of the gray squeteaque (sea trout), Cynoscion regalis, investigation; the trawl-fishery investigation of Delaware Bay; the beach-zone investigation; and blue-crab and oyster studies.

Die See- und Kustenfischerei und die Fischversorgung der Bundesrepublik Deutschland im Jahre 1954 (The High Seas and Coastal Fishery of the Federal Republic of Germany and the Fish Supply of that Republic in 1954), Statistische Berichte series, 63 pp., printed in German. Statistisches Bundesamt, Wiesbaden, Germany, June 1955.

"Diving Through an Undersea Avalanche," by Capt. Jacques-Yves Cousteau, article, The National Geographic Magazine, vol. CVII, no. 4, April 1955, pp. 538-542, illus., printed, single copy 65 cents. National Geographic Society, Washington, D. C. Describes an exploration nearly a mile beneath the Mediterranean in the French Navy's bathyscaphe which started an avalanche of mud from the cliffsides of an oceanic canyon.

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Drift Currents in the Red Tide Area of the Eastermost Region of the Gulf of Mexico, by Ilmo Hela, Donald de Sylva, and Clarence A. Carpenter, Report 55-11, 33 pp., illus., processed. The Marine Laboratory, University of Miami, Coral Gables, Fla., March 1955. In a red-tide outbreak, dead fish are frequently seen floating on the sea surface, even far offshore. Under certain conditions, as yet not completely known, the dead fish are flushed ashore and the occasional litterings of the beaches with the unpleasant results are probably the principal ways in which red tide affects the inhabitants of the west coast of Florida, both economically and otherwise. During 1954 two drift-card operations were performed in the easternmost shallow region of the Gulf of Mexico. Given the locations and times of the drops and of their recovery, the direction and speed of the resultant movement of the driftcards may be deduced with relative accuracy, provided that one takes into consideration only those cards which are found either afloat offshore or those which, if picked up ashore, are found soon after their landing. The authors state that, "during red-tide outbreaks in the future it should be possible to forecast the manner and place in which dead fish are likely to wash ashore, simply from wind data. It is hoped that this knowledge will prove useful to the citizens of the Gulf Coast of Florida in their efforts to eliminate the effects of the red tide."

"The Effects of Iced and Frozen Storage Upon the Trimethylamine Content of Flounder (Parophrys vetulus) Muscle," by Charlie M. Good and Joseph A. Stern, article, Food Technology, vol. 9, no. 7, July 1955, pp. 327-332, illus., printed. The Garrard Press, 119 West Park Ave., Champaign, Ill. A report of a study of the relationship of quality prior to freezing to the changes occurring during frozen storage of fish muscle. Standard tests for spoilage were employed. English sole (Parophrys vetulus) were held in iced storage for periods ranging from 0 to 15 days. At intervals during this period samples were removed from the ice and filleted. Fillets were packaged, frozen, and held in frozen storage at 0^{0} F. for periods up to 24 weeks. Samples were subjected to various spoilage tests prior to freezing and at intervals during the period of frozen storage. Of the various tests investigated, only the determination of trimethylamine was found to be of value in estimating the quality of English sole prior to freezing. The trimethylamine content of the fillets did not change during frozen storage, and it was concluded that the test could be used, after frozen storage, to indicate the quality of the flesh at the time it was frozen.

La Escasez de la Manjua (JENKINSIA LAMPARTAENIA) y Apuntes Para su Posible Solucion en Cuba, by Jose M. Torres Curbelo, 20 pp., illus., processed, in Spanish. Seccion de Asuntos Pesqueros, Division Agricola, Banco de Fomento Agricola e Industrial de Cuba, La Habana, Cuba, 1954.

Ficocoloides de Algas Marinas Cubanas, by Felix G. Soloni Toural, Contribucion No. 4 del Centro de Investigaciones Pesqueras, 23 pp., illus., printed in Spanish. Dependencia de la Division Agricola del Banco de Fomento Agricola e Industrial de Cuba, Playa Habana, Bauta, Cuba, 1954.

Florida Salt Water Fishing, 65 pp., illus., printed. Florida State Board of Conservation, Tallahassee, Florida. Includes a guide to Florida salt-water fishing by Federal highways; list of the prominent game fish of Florida, with instructions on where and how to catch them; illustrations and descriptions of some of the world's finest game fish; salt-water fishing laws; and a summary of Florida commercial marine-fish landings for 1952 by species. Also includes a discussion of the nutritive value and preparation of Florida fish and shellfish and recipes for cooking these fish and shellfish.

(FAO) Report to the President of the Foreign Operations Administration, January 1953 to June 1955, 25 pp., printed. Foreign Operations Administration, Washington, D. C., June 30, 1955. An account of some of the major activities of the Mutual Security Program and a review of the work of the many Executive Branch agencies which have cooperated in the conduct of this program. The report on progress covers (1) major shifts in program emphasis; (2) new program methods; (3) improved program organization and management; (4) reponse to emergencies and crises; and (5) the major results. A summary of the outlook in relation to the present status of the Mutual Security Program covers (1) U. S. economic interests; (2) Europe's economic future; (3) capital needs abroad; and (4) aid to underdeveloped areas.

A Historical Review of the Shad Fisheries of North America, by Romeo Mansueti and Haven Kolb, Publication No. 97, 99 pp., illus., printed. Chesapeake Biological Laboratory, Solomons, Md., December 1953. A historical review of the shad fisheries was begun in 1951 in order to summarize and bring up to date the information to be found in the literature and available from various state and Federal agencies. The review covers several aspects that are not synthesized in the current literature, namely: (1) the role of management and regulations in the restoration of the shad fisheries; (2) the role of fishways in shad migrations; (3) the evaluation of hatcheries in the rehabilitation of shad runs; (4) a general study of the socio-economics of the fisheries; and (5) a review of the over-all and sectional trends and the annual recorded commercial production of shad. The study summarizes the essential points in: (1) a review of the early history of shad in each state and geographic area; (2) the current fisheries for shad in these areas; (3) factors contributing to the decline in production of shad in each state; and (4) recent information on life history, with emphasis on the phenomenon of migrations. A complete bibliography of American and foreign shads is included. At the same time, many scattered and significant studies dealing with basic research on the biology of shad, and effective means of managing the fisheries have been abstracted and cited in appropriate places in the report. During the past 50 years the

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relative productivity and value of the shad fisheries of North America have decreased as reflected in recorded commercial catches. In 1897 the United States catch aggregated almost 50 million pounds, and at the time was a growing valuable industry. In 1949 the fisheries ranked 38th in volume (about 11 million pounds), and 26th in value ($1.6 million). The reasons for the decline are due to many conditions that are biological and socio-economic in nature. These differ from one area to another in varying degrees. The factors which have been held responsible are: (a) pollution; (b) destruction or impairment of spawning and nursery areas by siltation; (c) overfishing; (d) hydroelectric and canal dams; and perhaps (e) natural fluctuations in abundance. Natural catastrophes, parasites, and predators are not considered important in causing a decrease in commercial production. Attempts to rehabilitate the fisheries by means of stocking artificially-reared fry and pond-reared fingerling shad appear to have failed in every instance. The introduction of shad fry on the Pacific Coast, however, has resulted in a major fishery. Early in the history of the decline, the first attempts at managing shad were in the form of week-end interdictions, limiting of seasons, and of declaring illegal certain gear that were highly efficient. The most recent and significant program is a controlled catch management plan operating at this time only in Maryland, which attempts to control the fishing rate for shad by restricting the number of fishermen and gear through a licensing program in order to assure a greater escapement of brood stock and thus, in time, a greater sustained yield. An analysis of the conditions existing at three fishways at the following locations: (a) Bonneville Dam on the Columbia River, (b) Lawrence Dam on the Merrimack River, and (c) Holyoke Dam on the Connecticut River, indicates that such passes are not fully successful despite the transportation of numbers of shad over dams. One of the reasons for difficulty in evaluating passes is that the percentage of the total run that ascends fishways cannot be determined. The total run is unknown for all but a few rivers in North America. In the final analysis, the prognosis of the shad fisheries does not appear promising. It appears doubtful that shad can be restored to the status of the late 19th century even with management programs and other devices.

How To Set Up a Soft Shell Crab Plant in Florida, by Robert H. Young, Special Service Bulletin No. 11, 5 pp., processed. The Marine Laboratory, University of Miami, Coral Gables, Fla., April 1955. The results of an investigation during the fall of 1953, on behalf of the Florida State Board of Conservation, of the blue crab industry. This bulletin summarizes the method of setting up a plant for producing soft-shell crabs on a commercial scale. Crabs that will soon shed their shells are identified and separated by the color of the margin of the last segment of the swimming leg. The progressive color changes are: (1) white margin, (2) pink margin, and (3) red margin. With the appearance of the red margin the crab is about to shed its shell. Immediately following this stage a split occurs along the posterior edge of the shell and the crab then becomes a "buster." Crabs retained to become soft shells are kept in floats or bins. Floats are used where the water depth and tidal action is sufficient to ensure that the trapped crabs will be covered by water at low tides and be supplied with water that is oxygenated. When these conditions are not available bins are placed onshore and water pumped to them. Soft-shell crabs are shipped alive in special containers in dry moss. They may also be shipped and stored in the frozen state for short periods of time.

Inter-American Tropical Tuna Commission Annual Report for the Year 1953 (Comision Interamericana del Atun Tropical Informe Anual Correspondiente al Ano 1953), 88 pp., printed in English and Spanish. Inter-American Tropical Tuna Commission, La Jolla, Calif., 1954. Included in this report are: the recommended program of investigations; progress on investigations; membership changes; and a short resume of the Commission's regular annual meeting at San Diego, Calif., on August 14. An appendix to the report describes the investigations conducted by the Commission during 1953, and discussed in this section are the compilation of current statistics of total catch, amount and success of fishing, and abundance of the fish population; compilation and analysis of historical data; research on theory of fishing; research on the biology, ecology, and life history of tunas; investigation of the oceanography of the Eastern Pacific; investigations of the biology, ecology, and utilization of bait species; and experimental reintroduction of anchovetas to the Gulf of Nicoya. The Commission, established by a Convention between the United States and Costa Rica, has as its purpose the collection and interpretation of information which will facilitate maintaining at levels of maximum sustained yield the populations of tropical tunas in the Eastern Pacific and of the bait species used in their capture. The Commission, organized in 1950, is directed by the Convention to undertake investigations of the tunas and bait species, and to make recommendations for joint action by the member governments designed to attain the objectives of the Convention.

"Investigation & Management of the Atlantic Salmon," article, Trade News, vol. 7, no. 10, April 1955, pp. 3-11, illus., printed. Department of Fisheries of Canada, Ottawa, Canada. A decline in the stocks of Canada's Atlantic salmon resources occurred following the peak attained in commercial production of salmon in 1930, and its continuance was the cause of much concern to Canadian government agencies, commercial fishermen, and the growing number of salmon-angling devotees. To combat it, the Federal-provincial Coordinating Committee on Atlantic Salmon was formed to prevent duplication of effort and to develop a coordinated program of research, regulation, compilation of statistics, and development by fish-culture procedures, of Atlantic salmon stocks in the five East Coast provinces. A plan of action was adopted whereby all proposed policies on research, regulation, statistics, and development would be submitted

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to the Committee for review, and the provinces would be encouraged to cooperate with the Federal Government in filling existing gaps in the knowledge of Atlantic salmon. Under the Minister of Fisheries, the Fisheries Research Board of Canada is responsible for the investigation and coordination of all Atlantic salmon investigations, and for carrying out the main research projects. An important part of the research program is conducted in Quebec by the provincial Department of Fisheries. The Conservation and Development Service of the Federal Department of Fisheries is responsible for the application of techniques developed through research and the coordination of the efforts of all Department field officers. During the past two years (1953-54) there have been indications that the decline in Atlantic salmon stocks has become arrested, and the program has now entered its second phase... that of increasing stocks. Information gained from past and continuing studies will provide a valuable basis for the development of a sound administration of the Atlantic salmon fishery. Progress made up to December 1953, particularly the results of the intensified research and application programs of recent years, has been recorded in detail by the Scientific Sub-Committee of the Coordinating Committee. This article deals with projects carried out and conclusions arrived at in 1954.

Journal du Conseil, vol. XX, no. 2, 118 pp., illus., printed, single copy Kr. 12 (US$1.74). Messrs. Andr. Fred. Høst & Søn, Bredgade, Copenhagen, Denmark, December 1954. Among the articles presented in this journal are the following: "Distribution of Laminariaceae around Scotland," by F. T. Walker; "Engineering and Economic Aspects of Marine Plankton Harvesting," by Philip Jackson; and "The Destruction of Oyster Spat by Urosalpinx cinerea (Say) on Essex Oyster Beds," by D. A. Hancock.

"The Kannizzati Fishery of Malta," by T. W. Burdon, article, World Fishing, vol. 4, no. 7, July 1955, pp. 20-21, 44, illus., printed. John Trundell Ltd., Temple Chambers, Temple Ave., London, E.C.4. Describes the method of fishing in the waters around Malta with a "kannizzati" net--a true lampara. Approximately 40 percent of the fish landed in Malta each year originates from the "kannizzati" fishery. This fishery is remarkable in that the fishermen harvest a resource which is largely neglected elsewhere. Catches consist almost entirely of dolphin and pilotfish which migrate into the waters around Malta in August, leaving in December. These fish will collect around any floating object in the open sea and it is this habit which the fishermen exploit.

"The Long Haul," by John L. Farley, article, Bulletin of the International Oceanographic Foundation, vol. 1, no. 2, May 1955, pp. 12-17, illus., printed. The Marine Laboratory, University of Miami, Coral Gables, Fla. A review of the Fish and Wildlife Service's programs for the conservation and development of our Nation's fishery resources, with particular reference to the new Gulf of Mexico tuna fishery, conservation of salmon, and international aspects of fishery resources between now and 1975 according to Service predictions.

Microbiology--An Introduction, by Ernest A. Gray, 187 pp., illus., printed, $3.75. Philosophical Library, Inc., New York 16, N.Y., 1955. This book is a simple introduction to microbiology. The author indicates how organisms are so intimately associated in nature--in other words, he stresses their ecology--and at the same time points to the invaluable work of pioneers. By stressing the historical background of a science, the author presents a more sober and a more realistic approach to microbiology as a whole or to the many fascinating important puzzles it presents. Of particular interest to those interested in the resources of the waters will be the chapters dealing with algae and the microbiology of inland waters and the sea.

--J. Pileggi

The Occurrence of Oily Pilchards in New South Wales Waters, by M. Blackburn and R. Downie, Division of Fisheries Technical Paper No. 3, 11 pp., illus., printed. Commonwealth Scientific and Industrial Research Organization, Melbourne, Australia, 1955. Efforts were made to check a hypothesis that pilchards are abundant below the surface and sufficiently fat to be profitably reduced into oil and meal in the summer months on the coast of New South Wales. Results obtained in January 1954 in the Port Stephens-Newcastle area were highly satisfactory. Although shoals were not seen at the surface they were readily detected in abundance by echo-sounding, and all samples taken by drift net consisted of fat fish. Oil content ranged from 11 to 17 percent by weight of raw fish (compared with 5 percent or less in the same region in winter), which would permit profitable reduction if sufficiently large and regular catches could be made.

"One Hundred Hours Beneath the Chesapeake," by Gilbert C. Klingel, article, The National Geographic Society, vol. CVII, no. 5, May 1955, pp. 681-696, illus., printed, single copy 65¢. National Geographic Society, 16th and M St., NW., Washington 6, D. C. A description of a study, with photographs in color, of the creatures that live in swarming millions in the Chesapeake Bay's depths. Beneath these black waters, two men in a strange diving chamber, the Aquascope, explored the mysteries of marine life in its natural habitat.

El Ostion Comercial de Cuba, by Isabel Pereze Farfante, Contribucion No. 3 del Centro de Investigaciones Pesqueras, 42 pp., illus., printed in Spanish. Dependencia de la Division Agricola del Banco de Fomento Agricola e Industrial de Cuba, Playa Habana, Bauta, Cuba, 1954.

"Photographing the Sea's Dark Underworld," by Harold E. Edgerton, article, The National Geographic Magazine, vol. CVII, no. 4, April 1955, pp. 523-537, illus., printed, single copy 65 cents. National Geographic Society, Washington, D. C. A description of an exploration of the Mediterranean depths with steel-encased cameras operated from cables, sleds, and bathyscaphe.

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Aqualunged photographers cannot safely penetrate the ocean's vast realm more than 240 feet beneath the surface. The bathyscaphe has made it possible to send men and cameras 13,287 feet down to the bottom. Cable-suspended units have obtained effective and automatic photographic coverage of marine life in the vast intermediate zones.

Red Tide Outbreaks off the Florida West Coast, by Anita Feinstein, A. Russell Ceurvels, Robert F. Hutton, and Edward Shoek, Report 55-15, 45 pp., illus., processed. The Marine Laboratory, University of Miami, Coral Gables, Fla., March 1955. A compilation of reports of red tide on the west coast of Florida from 1844 to January 1955 is given. Also included are two working diagrams of incidence of red tide, suggesting that (1) red tide occurs more frequently in the months August through January, (2) the individual red-tide outbreaks are part of larger outbreaks which seem to move from south to north, and (3) summer outbreaks appear to originate mostly north of Venice, winter and spring outbreaks farther south. Additional data are required to give complete support to (2). If this is substantiated, it is pointed out that control may be exerted by action in a limited focal area or areas of origin. Otherwise the problem of control may be of the greatest difficulty since it will require action over a much wider area or areas.

Report on Pollution and Fish Mortality in Bayou Chico, Pensacola, Florida, by Donald de Sylva, Report 55-21, 4 pp., processed. The Marine Laboratory, University of Miami, Coral Gables, Fla., May 1955.

Salinidad Temperatura y pH en la Playa Habana, by Felix Soloni Toural, Contribucion No. 8 del Centro de Investigaciones Pesqueras, 5 pp., illus., printed in Spanish. Dependencia de la Division Agricola del Banco de Fomento Agricola e Industrial de Cuba, Playa Habana, Bauta, Cuba, 1954.

Sea Moss (CHONDRUS CRISPUS), Survey West Point to Pemaquid Neck, by Walter S. Foster, General Bulletin No. 4, 12 pp., illus., printed. Department of Sea and Shore Fisheries, Augusta, Maine, December 1954. An attempt has been made to determine the amount of sea moss, Chondrus crispus, an average moss raker could gather from the ledges and islands from West Point to Pemaquid Neck. On the maps of the regions surveyed showing density of moss, symbols have been added to show characteristics of the moss conditions in particular areas. Density of moss is shown indicating in hundreds of pounds the amount of moss that could be raked per tide under normal conditions. Eight hundred pounds per tide would be average. The results given in this report can be interpreted as the total number of good loads (700 pounds per tide or over) or poor loads (600 pounds per tide or less) that an average moss raker would be able to gather.

(Uganda) Annual Report of the Game and Fisheries Department (For the Year Ended 31st December, 1953), 157 pp., illus., printed, 6s. (84 U.S. cents), The Government Printer, Entebbe, Uganda, 1955. Includes a section on the fisheries of the Uganda waters of Lake Victoria; Lake Albert (including the Albert Nile and associated fisheries); Lake Kyoga and waters of eastern Uganda; and Lakes George, Edward, and waters of western Uganda. Tables give the 1953 catch of fishery products by months and species for Lake George and by species for Lake Edward and Kazinga Channel; and quantities and values of dried (salted) and smoked fish exported in 1953 from Lakes Edward, George, and associated fisheries. Consumption of fish in Uganda in 1953, potential fisheries of Lake Albert, marketing of fish, exploratory and experimental fishery investigations, fish farming, boat building, water pollution, and angling are some of the other subjects covered. Other sections of the report deal with game.

United Kingdom Importers of Canned Fish, SBM No. 55-9, 2 pp., processed. The Office of Small Business, Foreign Operations Administration, Washington 25, D. C., June 9, 1955. A list of United Kingdom importers of canned fish, containing names and addresses supplied by the London Chamber of Commerce.

(Washington) State of Washington Commercial Fishing Statistics, 1954, 47 pp., printed. Washington State Department of Fisheries, Fishermen's Terminal, 4015 20th Ave. W., Seattle, Wash. Consists almost entirely of tables showing landings of fish and shellfish in the State of Washington by districts, species, and gear. Comparative data on the catch of most items are shown for the years 1935 through 1954. The report also contains information on the value of landings, vessels, and plants; and the operating expenses of processors, boatyards, and related information. Data are shown on the Washington salmon pack from 1900 to 1954, as is information on the United States and British Columbia Fraser River sockeye pack arranged by cycle years from 1900 to 1954. Data on the canned pack of other fish and shellfish and the production of oil and meal are also shown. In addition, the report contains data on the monthly salmon escapement over Bonneville Dam during the years from 1938 to 1954; the number of commercial fishing licenses issued by districts from 1938 to 1954; and a comparative statement of receipts from licenses, taxes, fines, and other sources.

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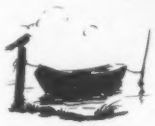
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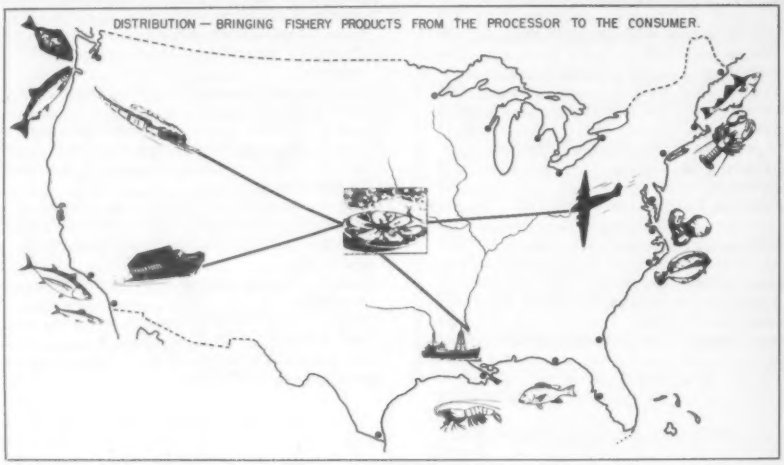
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SHIPPING FISHERY PRODUCTS

There are two basic factors involved in the transportation of fishery products, according to a recent talk by a transportation expert of the Department of Agriculture. These factors are: (1) maintaining the quality during transportation, and (2) low shipping costs. There are 10 different practices which should be followed to preserve quality during transportation:



1. Shippers should inspect transportation equipment in which their merchandise is to be transported.

2. Truck equipment should be supplied with floor racks and the load should be placed so as to allow air circulation throughout.

3. Mechanical refrigeration should be checked to see if it is adequate to assure proper refrigeration of the entire load. Supplement with dry ice, if necessary.

4. Equipment should be precooled. If water ice is used, check drains for stoppage; see that plugs fit securely in ice bunkers.

5. Refrigerator cars should be precooled at least 24 hours during warm to hot weather.

6. Do not spare ice and salt during warm to hot weather. A few extra dollars for ice and salt may be the difference of partially defrosted merchandise or complete spoilage.

7. Check location of icing stations en route to destination to see if properly spaced to insure re-icing every 12 to 16 hours, at least during hot weather.

8. Avoid circuitous routings.

9. Trucks are susceptible to a tremendous amount of heat over the highways during hot weather. Check for unreasonable layovers on long-haul shipments.

10. The shipper is generally held responsible for the condition of the merchandise on arrival at destination. An ounce of prevention will save claims and a disappointed customer.